# SHOSHONE NATIONAL FOREST

# MONITORING AND EVALUATION REPORT

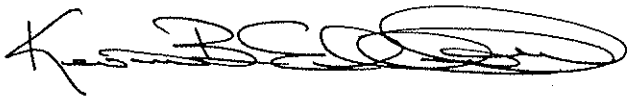
# FISCAL YEAR 1995

(Includes Fiscal Year 1994 Information)

## CERTIFICATION

I have reviewed the Shoshone National Forest annual Monitoring and Evaluation Report for fiscal year 1995. Analysis associated with project implementation under the Forest Plan indicates that the Shoshone National Forest Land and Resource Management Plan, as currently amended, is sufficient to guide implementation through the coming year.

Several changes to the monitoring requirements in the Forest Plan are recommended in this report. Recommendations include changes to the data sources/techniques used to monitor or, in some cases, changes to the monitoring item itself. Changes are intended to improve monitoring and to clarify results. It is recommended that these items be addressed during Forest Plan Revision.



KEVIN B. ELLIOTT
Acting Forest Supervisor

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## INTRODUCTION

Monitoring may not be well understood by the public. Monitoring is not an end unto itself: monitoring is the preliminary step in the process of deciding whether or not to amend or revise the Shoshone's 1986 Forest Plan. The statutory purpose for monitoring stated in the National Forest Management Act is to ensure that the management system selected in the Forest Plan "will not produce substantial and permanent impairment of the productivity of the land." 16 U.S.C. § 1604(g)(3)(C). In order to avoid this result, Forest personnel monitor and evaluate the data collected in order to determine how well Forest Plan objectives are being met and how closely Forest Plan standards and guidelines have been applied. The regulations also provide for evaluation on a sample basis rather than a comprehensive basis.

Once the report is completed there are two additional steps in the process of deciding whether to amend the Forest Plan. First, an interdisciplinary team evaluates the data collected through monitoring and recommends to the Forest Supervisor whatever changes the team deems necessary. Second, at some point the Forest Supervisor reviews the team recommendations and makes a decision whether or not change is warranted in the way the Forest Plan is implemented.

The Shoshone National Forest prepared its first comprehensive monitoring and evaluation report in 1989 which covered the period 1986-1988. The Forest did not prepare comprehensive monitoring and evaluation reports during the period from 1989 through 1993. Nevertheless, the Forest carefully evaluated and responded to changes in the resource base caused by the 1988 Yellowstone fires and recommended a Forest Plan amendment. The Forest Supervisor then decided to reduce the Allowable Sale Quantity by over 50% - from 11.2 MMBF to 4.5 MMBF. Moreover, the Forest also amended the Plan to accommodate its new authorities under the Federal Onshore Oil and Gas Leasing Reform Act. A less than comprehensive monitoring and evaluation report was prepared for fiscal year 1992 which addressed these two major Forest-wide efforts.

The following report evaluates Forest Plan implementation during fiscal year 1995, and also includes fairly comprehensive data for 1994. Additional multi-year data is presented in some cases in order to provide perspective on the current state of Forest Plan implementation. Lower than anticipated budget levels have caused monitoring and evaluation to be less comprehensive than originally envisioned in many cases. However, monitoring efforts have been sufficient to allow the interdisciplinary team to evaluate implementation of the Forest Plan and make recommendations for the Forest Supervisor's consideration. Shoshone National Forest employees have become increasingly creative at implementing the Forest Plan and monitoring under existing budget levels. Some of the approaches noted in this report such as organizing into self-managed teams and working with volunteers, permittees, special interest organizations, educational institutions, other agencies and National Forests, will become increasingly common as Federal budgets continue to shrink. The Shoshone's partners have helped us build trails, survey wintering bald eagles, educate the public about low impact camping, and at times they have helped us monitor.

This report evaluates Forest Plan implementation under 57 criteria from the 1986 Shoshone National Forest Plan as amended. The report concludes with the interdisciplinary team recommendations to the Forest Supervisor. Some of the recommended changes may be implemented through Forest Plan amendment or revision which begins in 1997.

## FOREST PLAN

### 1. Significant Changes in Land Productivity and Any Problems, Needed Changes or Lack of Performance in the Application of All Prescriptions

The Shoshone National Forest Plan consists of management prescriptions intended to reach a set of desired future conditions and to produce a mix of goods and services. Forest Plan management prescriptions were developed to conserve soil and water resources and to not allow significant or permanent impairment of the productivity of the land (36 CFR 219.27 (a)). The effectiveness of Forest Plan prescriptions and the status of land productivity in terms of soil and water resources are monitored on the Shoshone at various levels.

Over the past five years the Forest has been involved in three Forest-wide environmental analysis efforts. The Oil and Gas Leasing Environmental Impact Statement, December, 1992; the Allowable Sale Quantity Amendment, August, 1994; and Range analysis, which began in fiscal year (FY) 1995. Cumulative effects on watersheds have been addressed, beginning with the Oil and Gas analysis, through the Watershed Cumulative Effects Model (WCEM) developed on the Forest (see Water Resources, Soils, and Facilities sections). The WCEM was again used in conjunction with the Allowable Sale Quantity analysis and, more recently, as part of the Range Analysis.

Forest Plan standards and guidelines designed to conserve soil and water resources are also monitored at project implementation.

#### Evaluation

There have been no long-term changes in land productivity on the Shoshone since the Forest Plan was released.

The Forest did experience a short-term change in land productivity in some areas where the 1988 Clover Mist Fire burned especially hot. Of the estimated 120,000 acres burned, approximately 9,000 were in the suited timber base on the Clarks Fork District. The Forest's ability to produce the timber volumes projected in the Forest Plan were affected by the fires. For this and other reasons (see Allowable Sale Quantity discussion under the Timber Resources heading), the allowable sale quantity (ASQ) was reanalyzed resulting in an amendment to the Forest Plan. The WCEM was used to address the effects of fire, past management activities, and possible future activites on watersheds. As a result, the ASQ decreased from an annual average of 11.2 million board feet to 4.5 to give watersheds time to recover and to protect other resources. Five years after the 1988 fires, some of the severely burned areas showed signs of recovery and revegetation indicating no loss of long-term land productivity.

### 2. Actual Costs of Applying Management Direction from the Forest Plan

The actual costs of applying management direction are monitored by comparing actual Forest budgets with Forest Plan projections. Table 1 is a comparison of the Forest budget for the years 1987 through 1995 with what the Forest Plan predicted. Since the Plan was signed in February of 1986 two budget amendments have been made to the Forest Plan to correct omissions and changes in workload.

**Evaluation**

Forest budgets have been decreasing in the last several years and are expected to continue declining at least in the near future. Although budgets allocated to particular resource areas fluctuate - increases are experienced in some areas while other areas decrease - the overall budget has been on a downward trend since 1993. The Forest Service (and many other Federal agencies) have experienced declining budgets as the Federal Government attempts to reduce the Federal deficit.

The ability to implement the Forest Plan depends not only on the budget received but on the level of funding received for a particular resource area.

## TABLE 1: FOREST BUDGET IN THOUSANDS OF 95$

| Activity | Forest Plan | FY 1987 | FY 1988 | FY 1989 | FY 1990 | FY 1991 | FY 1992 | FY 1993 | FY 1994 | FY 1995 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
| **LAW ENFORCEMENT** | 25.79 | 23.76 | 23.80 | 23.92 | 22.40 | 34.99 | 18.87 | 12.48 | 14.25 | 95.20 |
| **CULTURAL RESOURCES** | 101.79 | 63.72 | 21.30 | 34.27 | 35.73 | 49.03 | 71.66 | 96.62 | 85.38 | 23.80 |
| **ECOSYSTEM MGMT** | | | | | | | | | | |
| ECOSYSTEM MGT CN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ECOSYSTEM MGT NF | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,070.80 |
| **ECONOMIC DEVELOP** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 26.50 | 15.60 | 0.00 | 0.00 |
| **FACILITIES** | | | | | | | | | | |
| FACILITIES CONSTR | 155.25 | 0.00 | 0.00 | 6.10 | 75.15 | 64.91 | 254.19 | 579.38 | 0.00 | 35.20 |
| FACILITIES MTCE | 293.49 | 84.96 | 62.36 | 147.66 | 74.37 | 85.97 | 121.48 | 42.64 | 63.23 | 94.00 |
| FEDERAL HIGHWAY | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.20 |
| ROAD CONST GENERAL | 747.90 | 0.00 | 774.57 | 123.74 | 92.29 | 299.38 | 161.12 | 59.80 | 44.17 | 0.00 |
| ROAD CONST RECREATN | 18.90 | 0.00 | 22.13 | 64.98 | 6.16 | 16.74 | 149.67 | 151.01 | 447.51 | 133.40 |
| ROAD CONST TIMBER | 74.25 | 0.00 | 177.31 | 112.01 | 107.86 | 99.47 | 114.27 | 251.58 | 24.13 | 3.20 |
| ROAD MTCE | 688.77 | 237.24 | 204.32 | 230.35 | 230.05 | 264.60 | 190.80 | 100.57 | 167.65 | 166.70 |
| **FIRE MANAGEMENT** | 154.58 | 194.64 | 111.38 | 159.50 | 31.92 | 238.68 | 325.42 | 360.98 | 303.76 | 227.50 |
| **GENERAL ADMIN** | 1,330.43 | 1,119.72 | 1,019.83 | 1,031.55 | 1,279.15 | 1,266.84 | 1,290.13 | 1,153.05 | 1,219.10 | 1,086.30 |
| **KNUTSON/VANDENBRG** | 44.55 | 80.52 | 94.72 | 75.56 | 65.18 | 27.54 | 56.07 | 14.46 | 42.43 | 2.20 |
| **LANDS** | | | | | | | | | | |
| LANDS - GENERAL | 161.06 | 79.44 | 70.21 | 84.53 | 87.92 | 128.74 | 152.22 | 104.73 | 123.14 | 125.60 |
| LAND LINE LOCATION | 26.06 | 3.84 | 17.26 | 19.55 | 20.94 | 25.27 | 27.45 | 4.68 | 2.81 | 8.70 |
| LAND/WATER CONS FND | 31.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.09 | 0.00 | 0.00 | 22.90 |
| **MINERALS** | 219.92 | 178.44 | 90.44 | 113.62 | 92.06 | 127.33 | 246.13 | 140.19 | 81.74 | 15.40 |
| **RANGE** | | | | | | | | | | |
| NOXIOUS WEEDS | 2.70 | 3.72 | 0.00 | 0.00 | 0.00 | 0.00 | 3.39 | 8.84 | 4.68 | 8.80 |
| RANGE ADMINISTRATION | 372.06 | 263.76 | 263.59 | 269.68 | 306.43 | 322.49 | 379.69 | 284.13 | 292.76 | 484.30 |
| RANGE IMPROVEMENT | 80.19 | 27.96 | 37.13 | 0.00 | 4.59 | 27.97 | 28.51 | 19.34 | 22.67 | 47.50 |
| **RECREATION** | | | | | | | | | | |
| RECREATION CONST | 264.47 | 0.00 | 50.46 | 100.86 | 38.53 | 147.64 | 146.49 | 0.00 | 169.21 | 213.50 |
| RECREATION | 919.89 | 494.04 | 686.15 | 800.63 | 864.75 | 1,366.09 | 780.16 | 866.32 | 952.22 | 849.40 |
| **SOIL AND WATER** | | | | | | | | | | |
| SOIL & WATER ADMIN | 194.67 | 125.88 | 70.57 | 21.16 | 66.42 | 178.31 | 35.51 | 252.41 | 200.62 | 95.50 |
| SOIL & WATER IMPROVE | 203.58 | 0.00 | 12.50 | 7.01 | 29.34 | 54.11 | 5.30 | 0.00 | 37.75 | 81.50 |
| SOIL INVENTORY | 195.75 | 0.00 | 60.33 | 209.30 | 143.14 | 197.21 | 239.14 | 287.98 | 204.67 | 270.00 |
| **T & E ADMIN** | 383.40 | 270.12 | 116.38 | 138.35 | 189.62 | 279.29 | 275.18 | 264.99 | 264.37 | 189.10 |
| **TIMBER** | | | | | | | | | | |
| TIMBER ADMINISTRATION | 82.62 | 152.28 | 142.32 | 177.79 | 232.96 | 377.89 | 195.36 | 16.85 | 81.85 | 141.10 |
| TIMBER EXAM | 65.61 | 45.48 | 0.00 | 37.95 | 57.23 | 59.62 | 35.93 | 11.13 | 22.15 | 0.00 |
| TIMBER IMPROVEMENT | 46.58 | 62.88 | 38.91 | 38.18 | 33.04 | 2.05 | 29.68 | 2.29 | 36.82 | 0.00 |
| TIMBER PLANNING | 179.96 | 64.80 | 32.01 | 17.25 | 33.49 | 91.69 | 263.09 | 108.68 | 147.26 | 0.00 |
| TIMBER PREPARATION | 163.35 | 248.04 | 220.63 | 271.06 | 153.89 | 108.22 | 155.50 | 133.02 | 65.94 | 0.00 |
| BRUSH DISPOSAL | 22.95 | 32.52 | 19.52 | 13.34 | 8.85 | 3.78 | 11.45 | 3.85 | 3.02 | 3.20 |
| INSECT & DISEASE MGMT | 0.00 | 19.44 | 30.46 | 34.62 | 20.83 | 108.54 | 49.50 | 11.75 | 0.00 | 0.00 |

## TABLE 1: FOREST BUDGET IN THOUSANDS OF 95$

| Activity | Forest Plan | FY 1987 | FY 1988 | FY 1989 | FY 1990 | FY 1991 | FY 1992 | FY 1993 | FY 1994 | FY 1995 |
|---|---|---|---|---|---|---|---|---|---|---|
| REFORESTATION | 14.85 | 0.00 | 4.76 | 38.18 | 6.05 | 37.69 | 226.63 | 162.55 | 189.90 | 184.70 |
| SALVAGE SALE FUND | 110.70 | 50.88 | 78.30 | 173.19 | 82.43 | 288.36 | 228.01 | 217.46 | 188.55 | 219.20 |
| **TRAILS** | | | | | | | | | | |
| TRAIL CONSTRUCTION | 554.85 | 29.64 | 133.40 | 91.08 | 352.91 | 120.64 | 53.32 | 142.17 | 9.26 | 73.60 |
| TRAIL MAINTENANCE | 340.20 | 99.60 | 458.51 | 228.39 | 199.02 | 229.72 | 277.83 | 247.42 | 343.51 | 0.00 |
| **WILDERNESS** | 376.65 | 252.72 | 154.11 | 92.92 | 126.69 | 761.29 | 248.04 | 240.55 | 171.18 | 403.80 |
| **WILDLIFE AND FISH** | | | | | | | | | | |
| WILDLIFE ADMIN | 427.28 | 199.56 | 190.52 | 266.69 | 378.22 | 457.60 | 417.75 | 322.82 | 258.75 | 118.40 |
| FISH | 157.41 | 0.00 | 0.00 | 0.00 | 0.00 | 24.41 | 100.38 | 117.62 | 80.70 | 45.90 |
| **TOTAL** | 9,233.46 | 4,509.60 | 5,490.18 | 5,254.93 | 5,551.62 | 7,974.07 | 7,396.89 | 6,809.92 | 6,367.15 | 6,549.60 |
| **% OF FOREST PLAN** | 100 | 49 | 59 | 60 | 60 | 86 | 80 | 74 | 69 | 71 |

## RECREATION

The Forest has been working on a Geographic Information System (GIS) database for the grizzly bear recovery area for the last several years. The impetus is primarily to assess the effects of human activities on grizzly bear habitat effectiveness (see Grizzly Habitat Effectiveness discussion under Threatened and Endangered Species heading). However, it was designed to facilitate numerous other uses and could prove an effective monitoring tool for recreation. The database was completed for the Clarks Fork District in 1995 and will be completed for the rest of the recovery area in 1996. The recovery area encompasses roughly 2/3 of the Forest north of the town of Dubois.

The database contains digitized information on all open and closed roads, trails, point source human activities (including dispersed and developed campsites), and polygons defining dispersed human use not confined to points or linear features. Attribute information attached to each feature includes dates of use and intensity of use. Roads are also identified as open or closed and degree of closure (gate or permanent barrier).

The database reflects the current best information available regarding the location and levels of human use in the recovery area and will serve as a baseline in which to monitor future changes. The area of application could be expanded to other areas of the Forest.

### 1. Off Road Vehicle Use of Designated Travelways

Off road vehicle (ORV) use is prohibited on the forest except for travel on designated roads (signed with white arrows and/or Forest road numbers) and snowmobiles travelling on snow where permitted. ORV use has increased in popularity nationally in the last decade resulting in increased use on the Forest. Forest employees monitor off road use through observation and inspection. Monitoring of off road vehicle use provides the focus for ongoing management practices such as maintaining the white arrow sign program, closing newly developed road spurs, signing wilderness boundaries, identifying erosion problems on jeep roads, law enforcement, and making information contacts with off road vehicle users.

Considerable ORV use occurs on old roads that evolved through continued use and were not designed for the present kind of traffic (see Soil and Water Resource Improvement discussion under Soils heading). Resource damage is occurring on and immediately adjacent to such roads due to inadequate drainage and mechanical disturbance. Vehicular use of the road while it is wet and muddy leads to erosion. Deep ruts and tire tracks often characterize the road during the fall hunting season. Closures during wet periods have been considered but would be cost-prohibitive to enforce. In addition, vehicles are travelling off road surfaces.

The use of ORVs, primarily just before and during hunting seasons, has become established in a number of areas. Roads suddenly appear in previously unroaded areas as new two-track roads are created. The existence of "new roads" encourages and increases use by a variety of off-road type vehicles. The result is a cyclical expansion of travelways that cannot be maintained, and that can cause loss of vegetation, drainage problems and intrusion into important wildlife habitat. Spring use is also increasing as the number of horn hunters increases. The Forest is coordinating with the Wyoming Game and Fish Department to limit this activity to areas and times that are less disruptive to wildlife.

A related problem is the use of road ends and ORV created spurs for dispersed camping. Some visitors take up residence in campers and trailers. In a short time, vegetation is lost, soils are compacted, trees are cut for firewood, and makeshift furniture litters the surrounding area. This occurs in some areas during the summer, and in other areas as hunting season approaches.

In several areas, landowners adjacent to public lands are suffering the same impacts. Some recreationists abuse the rights granted by easement, or access private land from public land. Several adjacent landowners have closed roads in order to protect themselves from ORV users. This affects the Forest's relationships with neighbors, puts additional pressure on the Forest to provide access, and draws the Forest Service into adversarial situations with the public.

One of the most troublesome spots is the Union Pass area of the Wind River District. The large park-like character of the area makes it attractive to ORV users and at the same time very difficult to close off. The area is accessed from either the Shoshone or Bridger-Teton National Forests which accounts for the high volume of use. The Bridger-Teton has experienced considerable trouble trying to close the road leading to the area. Signs and gates have been routinely taken down and, like the Shoshone, the Bridger-Teton lacks the person power to patrol and enforce restrictions. Union Pass gets heavy dispersed use almost all year round (see Dispersed Recreation Use section). The Union Pass road is a good gravelled road that virtually any type of vehicle can travel. A network of side roads built mainly for logging purposes provides access to hunters, anglers, campers and ORV users.

Apart from the Union Pass area, other areas where the same activities and impacts are occurring include South Pass on the Washakie District, Rattlesnake Mountain, Logan Mountain, and Carter Mountain on the Wapiti District, Bear Creek Basin near Dubois and Phelps Mountain near Meeteetse.

**Evaluation**

ORV use is a difficult activity to limit and control on the Shoshone National Forest. The areas mentioned above are receiving ORV use because they are relatively easy to access and are popular among recreationists. Also, many communities near the Forest are experiencing increases in population and a resultant increase in recreation use which tends to involve the use of motorized recreational vehicles.

Monitoring indicates that the use of all terrain vehicles (ATV) is growing tremendously and off road use is growing annually. Because use has grown at such a fast rate, the Forest has not been able to respond to the demand by providing opportunities for this segment of the recreating public. The Forest needs to insure that sensitive areas that cannot tolerate ATV/ORV use are protected, while managing growing use by providing opportunities in areas capable of supporting it without degrading other resource values.

On the Clarks Fork District, the Morrison jeep road was the target of two 1995 projects as a result of monitoring by field personnel. An additional closure gate was installed at the south end of the road to halt access during the seasonal road closure. The road is closed when it is wet and the ground is unstable to prevent resource damage. At the north end, where the road meets the Beartooth Highway, the existing closure gate was relocated to a spot more effective for stopping access and a sign and a bulletin board explaining the travel order were installed.

Also on the Clarks Fork District, an all terrain vehicle/foot & horseback trail was constructed near the Switchback ranch to direct ATV use away from the open grassland bench and onto the designated trail. In addition, during the winters of 1994 and 1995, the Absaroka-Beartooth wilderness boundary west of Beartooth Butte was signed to prevent trespass by snowmobiles. Patrols in this area by Gallatin, Custer, and Shoshone law enforcement officers increased. Five travel order signs will be placed on roads in the elk winter range road closure area in 1996.

On the south end of the Forest (Washakie and Wind River Districts), District personnel met with ORV groups in Riverton and Dubois to discuss how they could help the Forest deal with ORV use issues.

Education of their members about proper use of ATVs and reporting violators of off road regulations were discussed. In Dubois, a partnership was developed with the local ATV Club to close some existing trails and sign some open trails.

Several areas were identified where motorized ATVs have entered the wilderness. In response, signing was improved and law enforcement patrols increased in these areas.

Ensuring the public is aware of areas open or closed to travel helps reduce ORV use problems. The south zone of the Forest has been actively working on signing roads using the "white arrow" system. Once signs are in place they will communicate to the public where they should be and allow Forest personnel to write violation notices. Violators are not cited if the Forest has not made it clear what is open and closed. Signing is almost complete on the Wind River and Washakie Districts.

Additional law enforcement support, including summer and fall seasonal personnel, would improve the situation. A second law enforcement officer was recently hired and will be stationed in Lander to cover the south end of the Forest.

The Forest will have concessionaires handling some of its developed campgrounds for the first time in 1996. The use of concessionaires could possibly free up funding for seasonal or permanent employees to patrol ORV use areas during critical times, such as during fall hunting. Another strategy might be to hire the Forest's seasonal workforce later in the summer, keep them on later in the fall and focus on higher priority fall situations.

Providing information and education to user groups is a good way to communicate what kind of impacts ORVs are having such as damage to water, soil, vegetation and disturbance to wildlife. The Shoshone is placing additional emphasis on public awareness and education.

On the Wapiti District, access to Rattlesnake Mountain, a popular hunting area, has been significantly reduced by adjacent landowners. This problem is being positively addressed by a working group composed of the Bureau of Land Management, Wyoming Game and Fish Department, the Forest Service, County Commissioners and county agencies. This effort is expected to provide a model of cooperation in solving access and other travel related problems in the future.

Other actions the Forest is considering include closures, or re-closures, of seldom used roads or trails, realignment of road sections, adoption of roads by organized clubs, and new travel management plans. These items are dependent on available funding or personnel.

**2. Trail Condition**

Trail condition is monitored annually on the Shoshone National Forest and trail maintenance is part of the Forest's annual program of work. Trail crews coming in from the field report on trail condition. This information is passed on to visitor information specialists who relay it to members of the public inquiring about current trail conditions. In general, trail maintenance is prioritized based on consideration of public safety and resource impacts.

There are approximately 1,459 miles of trails on the Shoshone. Motorized use is allowed on approximately 459 of these miles. In 1994, 618 miles of trail were maintained to a standard level and 215 miles were maintained to a less than standard level. In 1995, 760 miles were maintained to a standard level and 290 miles were maintained to a less than standard level (from Recreation Trail Information FY 1994 and FY 1995).

In 1994, a volunteer leader of the Arkansas Trails Association completed the trail inventory of the Fitzpatrick Wilderness on the south end of the Shoshone. The same volunteer spent the two previous years conducting an extensive inventory of the condition of trails in the Popo Agie wilderness. The detailed inventory identifies and prioritizes major rehabilitation and reconstruction needs along all the trails, contains photographs of sites, and estimates time, tools, materials and personnel needed to complete the work. The Forest's south zone volunteer trail program, which consists of 300 to 400 volunteer days per year, is focused on the major reconstruction and maintenance projects identified in this inventory.

A number of trail segments have long been inventoried as unsafe. Possibly the most extreme example is the trail over Deer Creek Pass on the Wapiti District. This trail conveys a large number of horse riders to and from the Thorofare area during the hunting season. About 1.5 miles of trail is narrow, slick rock, sloping into and above a steep drop into Deer Creek. Increased use over the past few years has made this a dangerous situation requiring attention.

In addition to summer/fall use of trails, the Forest also experiences winter trail use. On the north end of the Forest, field personnel inspect the Clarks Fork snowmobile trail annually in the summer or fall. The trail is groomed through a cooperative agreement with the Park County Snowmobile Association and the Wyoming Division of State Parks. Copies of the trail maintenance logs are reviewed by Forest recreation staff and maintenance inspection is done by state park personnel.

In 1994 trail direction signs for the Clarks Fork Snowmobile Trail were repaired and painted as needed. In 1995 the entire sign system was refurbished, high-maintenance sign stands were replaced with in-the-ground posts for all signs that mark the direction of the trail, new traffic control signs to be placed at each end of the trail where it encounters U.S. Highway 212 were constructed, and an avalanche danger sign with changeable hazard level indicators was also constructed.

The snowmobile system trails on the Wind River and Washakie Districts cover about 200 miles and connect with the system trails on the Pinedale, Jackson, and Buffalo Districts of the Bridger-Teton National Forest. The Continental Divide Snowmobile Trail (CDST) is a designated winter recreational trail that begins in Lander, Wyoming and traverses north across the Wind River Mountains to Grand Teton National Park. These trails are inspected annually by District personnel, local snowmobile organizations, and Wyoming Department of Commerce personnel for personal safety, trail reroutes, and additional signs. The Department of Commerce grooms the trails and the Forest, together with local volunteer groups, signs and stakes the trails. Trail counters are placed annually on several main trails to monitor use trends and, indirectly, trail condition as the two are somewhat related. Forest personnel also monitor use and facility condition through periodic inspection and feedback from users.

The CDST is monitored annually through the CDST Monitoring Plan which was developed in partnership with several environmental groups who were concerned about future impacts of the trail on other resource values. The plan includes monitoring of use, and impacts to vegetation, soil, water, air and wildlife. Each year the state of Wyoming compiles and prepares a season report based on the data collected by all the agencies involved with the trail. The CDST is used in localized areas, but has not received extensive use over its entire length primarily due to snow conditions that last several years.

Other winter uses on trails are nordic skiing and dog mushing. Both have grown in popularity but have created some safety hazards for all trail users. The Forest has initiated signing on most dual use trails to warn people of hazards. In addition, dog mushers and nordic skiers have been encouraged to use separate areas and trails. The entire nordic trail system on the Wind River District received heavy maintenance in 1995 complete with reroutes and signage to encourage more nordic use in these areas.

**Evaluation**

The Shoshone National Forest is having increasing difficulty meeting the public demand for trails. An increase in use of trails coupled with declining budgets have made it difficult to maintain trails to an acceptable standard. Sections of trail that are unsafe receive first priority. If a trail is in bad enough shape to pose a safety threat at the beginning of the field season, opening it to the public must be delayed until the trail crew can effect repairs. Sections of trail that are causing resource problems are a second priority and do not get consistent attention. Many of the Forest's trails in alpine country are currently in this condition.

In addition to overall use, varieties of use are also increasing. For example, outside wilderness new uses include mountain bikes, wheelchairs, runners, llamas and goats. Llamas and goats are used on wilderness trails as well. With each of these activities comes a separate set of maintenance challenges.

Winter trail use - snowmobiling, cross country skiing and backcountry skiing - is the fastest growing segment of recreation use on the Forest. Snowmobile trail counters on the south end of the Forest indicate a steady 8-10% increase in users annually since 1990. Some high use areas are experiencing deteriorated conditions. On the north end of the Forest, monitoring of winter use trails on the Clarks Fork District led to a recommendation to address increased use by snowmobiles on the section of U.S. Highway 212 maintained for wheeled vehicles. Snowmobile use on that section of highway will be addressed in 1996.

The Forest is dealing with these challenges in a number of ways. Volunteers help the Shoshone monitor, maintain and reconstruct trails. Use groups, such as the Backcountry Horsemen and the Sierra Club, have helped the Forest maintain trails. National Forests and the public benefit greatly from public involvement and the Shoshone will continue to involve volunteers.

Partnerships provide another opportunity to care for the Forest's trails. The examples already mentioned demonstrate the work that can be accomplished through the use of partnerships. In 1995, the most unsafe portion of the Deer Creek Trail was reconstructed through the efforts of the Backcountry Horsemen, the Sierra Club, the National Park Service, and the Bridger-Teton and Shoshone National Forests. Heavy construction materials were flown into Yellowstone National Park and then horsepacked to the construction site. Work involved trail tread reconstruction using heavy lumber retaining walls. Some realignment was also done. The Forest has received very positive reviews from outfitters and other forest visitors about the improved safety of this trail.

**3. Dispersed Recreation Use and Experience and 4. Dispersed Campsite Condition**

These items are highly interrelated, and are dealt with together in this report. The Forest Plan recommends that dispersed recreation use and experience be measured using the Recreation Information Management (RIM) system. Management is to be re-evaluated when use exceeds the Recreation Opportunity Spectrum (ROS) capacity guidelines for the management area prescription. During the past several years, the RIM system has been in a state of flux pending approval of a new system at the national level. Forest employees currently monitor dispersed sites through observation and inspection and do note use trends.

Forest Plan standards for campsite condition are stated in terms of Frissel Condition Class. Use of this system for monitoring proved to be unworkable as the Limits of Acceptable Change (LAC) process was undertaken on the Popo Agie wilderness. The modified Cole methodology proved much more descriptive and, as a result, more helpful in developing potential solutions to problems. Monitoring in accordance with this method has been applied primarily in wilderness backcountry sites (see Wilderness section).

Campsites in dispersed areas are monitored through observation and inspection by Forest recreation personnel. In general the focus tends to be on existing sites although occasionally new sites are created as use increases. It may take some time before Forest personnel are aware of the new sites.

**Evaluation**

In general, dispersed recreation has not been a problem except in isolated cases. Outside of wilderness, dispersed camping impacts are tolerated at a fairly high level. Employees inspect the heaviest used sites as they are able to. When areas are found damaged (i.e. trampling of vegetation, littering, new fire rings, etc.) Forest personnel rehabilitate and try to make them unattractive to camping by taking actions such as hauling away garbage, barricading, removing fire rings, structures or other traces of previous occupation. These actions are met with mixed success and determined campers can always find their favorite spots. In addition, length of stay requirements have been enforced which does lessen the impact from camping for extended periods of time. Other damaged sites, located in easily administered areas such as within plain sight of a road, have been successfully closed by posting with area closed signs.

On the north end of the Forest, dispersed recreation use has increased in the last several years. The Clarks Fork District has experienced increased use for several reasons including displaced use from the North Fork River corridor on the Wapiti District. The paving of the Chief Joseph Highway was recently completed and provides quicker easier access to Yellowstone National Park's northeast entrance. Road construction inside Yellowstone Park has meant daily closures of its east gate during the summer months and many travelers are choosing to go around to the northeast entrance rather than through the North Fork corridor to avoid delays. Local chambers of commerce are aggressively advertising the area. The result is heavy use of developed campground facilities especially along the corridors leading to Yellowstone National Park. Dispersed sites are full to capacity on summer weekends and less than full on week days.

The Beartooth Mountains on the Clarks Fork District are an increasingly popular recreation area. Increased use is a concern because it is a fragile alpine area characterized by wetlands. The Long Lake and Rainbow Lake dispersed sites were closed to vehicular access in 1995. Long Lake previously had minimal use but a new two track road was beginning to develop next to the highway. The Rainbow Lake site is located approximately 100 yards from a white arrow road. Off road restrictions require that vehicles stay within 100 yards of a white arrow road. District employees were concerned that new roads might develop from the campsite. That coupled with the fact that the location is on the edge of violating the 100 yard restriction led to the decision to close the areas to vehicles. The lakes can be accessed by foot or horse.

The Pilot Creek dispersed site, also on the Clarks Fork District, was identified as a problem spot several years ago. A popular fishing spot, it was getting heavy stream bank use resulting in trampled vegetation. Vehicles were driving right to the creek compounding the problem. Removal of vegetation holding the bank together accelerated the erosion process and sediment deposition in the stream increased. In 1994 an effort to stabilize the stream bank began led by the Forest Fisheries Biologist and the District Wildlife Biologist. The stream bank was re-contoured and grasses and willows were planted along it. Monitoring indicates the rehabilitation measures have been successful. The bank has been stabilized and grass is established. Though browsed heavily by moose, the young willows are growing.

There is considerable dispersed recreation use outside of wilderness on the Wapiti District. Most of it is occurring in late summer and during the fall in conjunction with hunting season. Much of the South Fork drainage below Aldrich and Ishawooa Creeks, Rattlesnake Mountain proper, and the

Trout Creek drainage contain such use. Access is limited to these areas, and motorized use has become an issue. Elk Fork Creek also has a considerable amount of dispersed day use outside of wilderness (See discussion under ORV Use).

Dispersed camping on the south end of the Forest is also in demand. There are an estimated 500 sites on the south end alone and some have been in use for 50 years or more. As on the north end of the Forest, monitoring of these areas is by observation and inspection which provides relative use trends. Heavy dispersed recreation sites on the Wind River District are Brooks Lake, the Wiggins Fork Road/Double Cabin area, and the Union Pass area.

The Louis Lake Basin on the Washakie District and Brooks Lake on the Wind River District are in need of dispersed recreation management. These areas are increasingly popular because of their proximity to water. Brooks Lake consists of a lodge, developed campground and dispersed camping all in a relatively small area. A systematic management plan is needed for the area based on a determination of the maximum capacity. At the moment there are no plans to do an area wide study because the resources required are not available. Even if they were and a plan were developed it would be difficult, if not impossible, to limit dispersed use without providing alternative areas. The Forest is working on ways to find funding to address the problems at Brooks Lake. Some of the options available are partnerships with other agencies or use groups and volunteers.

Resource damage in the form of soil compaction, erosion, and loss of vegetation is occurring at Louis Lake. Increased management at the site is difficult at present funding levels. The Washakie District is considering closing a number of campsites to prevent further damage but is faced with pressure (social, political) to keep sites open or develop new ones in their place.

Fiddlers Lake on the Washakie District was experiencing dispersed use problems for a number of years. Both developed and dispersed camping were occurring around the lake. The majority of the use was dispersed but facilities at the developed campground were being used by dispersed campers as well. Concentrated use around the lake was causing resource damage. The Forest was able to obtain approximately $500,000 in capital investment funds to upgrade the campground. Between 1994 and 1995 the area was converted to a mostly developed campground. Existing units were upgraded and in some cases moved to less sensitive locations. Eight to ten new units were added, new toilets and a new water system were installed and a trail was built along the lake. The project was completed at the end of fiscal year 1995 and is expected to relieve most of the problems.

**5. Developed Site Use**

Use of developed recreation sites on the Shoshone National Forest is monitored largely through user fees and observation. Use data is more reliable for sites where fees are collected. Where user fees are not collected, District recreation personnel keep track of use in a number of ways including car counts at trailheads, visual estimates, and sign in sheets. In 1994 the Forest experienced approximately 549,000 recreation visitor days (RVD). In 1995 the number of RVDs was up slightly to approximately 553,000. The following is a breakdown by activity of developed site use.

**Table 2: Developed Site Use by Activity in Thousand RVDs**

| Activity | FY1994 | FY1995 |
|---|---|---|
| Camping and Picnicking | 327 | 321 |
| Winter Sports | 17 | 19 |
| Resorts, Cabins, and Camps | 133 | 137 |
| Other Recreation Activities | 74 | 75 |

**Evaluation**

All of the National Forests including the Shoshone collect recreation use data and report it annually. However, a Government Accounting Office (GAO) report on recreation resources acknowledged in its findings that the Forest Service does not have uniform and consistent data on recreational sites or areas. Reliable data on maintenance and reconstruction needs is also lacking. There is an effort underway across the Forest Service to address this situation. The system being adopted is referred to as Meaningful Measures. The goals of this effort are to identify measurable components; establish standards of quality; determine realistic costs; prioritize work to be accomplished; allocate the program of work and agree on management attainment targets; and monitor, measure, and report actual management attainment.

The first goal has been accomplished on this Forest and the second is underway. Baseline data was collected and verified during the 1995 field season. This winter a customer survey will be conducted and the results will be used to monitor quality. This process is expected to help the Forest better define the quality of use it provides in addition to just the amount. Measures used to monitor will be consistent throughout the National Forest system.

**6. Developed Site Condition**

The Shoshone National Forest provides a wide variety of developed recreation opportunities. Campgrounds range from rustic sites with no potable water to paved, lit, wheelchair accessible sites. The largest percentage of campgrounds are on the rustic, undeveloped end of the scale. From a resource standpoint developed sites on the Forest are generally in good condition. From a facilities standpoint there are some problems particularly at the campgrounds. The degree to which facilities need improvement is somewhat difficult to quantify since personal preference influences how the condition of a facility is perceived. For example, people who prefer to camp in motor homes would probably consider a rustic campground without RV hookups inadequate. On the other hand a campground with damaged outhouses is clearly in poor condition.

Operation and maintenance of developed sites is part of the Forest's annual program of work. Facilities are maintained to the extent that funding levels allow.

**Evaluation**

Implementation of Meaningful Measures, the new Forest Service system mentioned under the previous monitoring element, will help the Forest establish clearer standards for measuring the condition of facilities at developed recreation sites. An inventory of developed sites was recently conducted on the Forest and that information is being loaded into a database during the winter of 1995/96. Information on developed site condition will be easier to manage once the database is complete.

The Shoshone, like other National Forests, is facing large budget cuts in the next several years. During the 1995 fiscal year, a decision was made to look for other ways to run some of our developed campgrounds. Volunteers, concessionaires and partnerships are some of the options that have been considered. Volunteer camp hosts and interpreters, for example, are utilized throughout the Forest and provide a tremendous service. However as recreation use increases, the Forest is less able to keep up with developed recreation facilities.

The campground facilities on the southern half of the Forest are in poorer condition than those on the northern half. Heavy maintenance work has not been completed in a number of locations because of personnel, time and funding limits. As a result, facilities are beginning to show signs of deterioration. The Louis Lake campground (see Dispersed Recreation discussion), for example, is receiving heavy use and subsequent resource impacts to the campsites and surrounding area. Major rehabilitation and/or reconstruction is needed. The water system in the Sinks Canyon campground requires constant maintenance. In 1995, six breakdowns occurred. Additional Capital Investment funds are needed to upgrade these facilities.

Considerable work has already been completed on developed sites on the south end of the Forest. In 1995, major reconstruction of the Fiddler's Lake Campground (mentioned above) was completed. Also in 1995, deteriorating barrier logs in the Pinnacles and Brooks Lake campgrounds were replaced. Work continues on the Bruce's Bridge Parking lot and Picnic Area on the Washakie District. This area was completely re-designed and reconstructed to accommodate use and prevent resource damage. It is anticipated that construction will be completed in 1996.

Presently an effort is underway to select concessionaires to operate and maintain some of the Forest's developed recreation facilities. Thirty three campgrounds and picnic grounds located in three areas are included in the proposal. All of the areas are located near major highways. They are the North Fork Shoshone River corridor on the Wapiti District, the Beartooth Plateau on the Clarks Fork District and the Togwotee Pass area on the Wind River District. The expectation is that a concessionaire will provide high quality service to visitors funded by user fees.

**7. Downhill Skiing Use**

The Forest has only one developed downhill ski area, Sleeping Giant, located on the Wapiti District. The area can accommodate approximately 2,000 skiers at one time (SAOT). In fiscal year 1995 (1994/1995 season) Sleeping Giant received 1,124 skier visits in the month of December, 1,178 in January and 1,036 in February. No use occurred in FY 94.

**Evaluation**

The Forest Plan recommends re-evaluation of the ski area development schedule when use exceeds managed capacity for three years. Sleeping Giant did not operate during the 1991/1992, 1992/1993 and 1993/1994 winter seasons. Last year's use figures indicate that use at Sleeping Giant has not come close to reaching capacity.

WILDERNESS

**1. Wilderness Use**

The Shoshone National Forest contains all or part of 5 wilderness areas totalling 1,379,048 acres or 56.7% of the total Forest acreage. Every Shoshone ranger district contains wilderness areas. They are the North Absaroka, Absaroka-Beartooth, Washakie, Fitzpatrick and Popo Agie. Though the Forest Plan recommended RIM as the technique for monitoring wilderness use, it has not been used for a number of years. See the Dispersed Recreation Use/Dispersed Campsite Condition section under the Recreation heading. Wilderness Implementation Schedules (WIS) have been completed for all wilderness areas on the Forest although funding has not been available to implement them completely. A WIS in its most simple form is a listing of activities, practices and projects that go into wilderness management.

In 1994 the Shoshone experienced an estimated 187 thousand recreation visitor days (RVD) in wilderness. In 1995 that number was slightly over 188,000 RVD. These are approximate numbers and do not provide as much information as the types of use, seasons of use and where use is concentrated. Wilderness use varies between the north and south halves of the Forest and between the wilderness areas themselves.

On the north half of the Forest, which includes the Absaroka-Beartooth, the North Absaroka, and a portion of the Washakie, use is greatest in the fall, during and just prior to hunting season. Summer use also takes place but to a smaller degree. Very little if any use occurs during the winter months. Wilderness users are largely hikers, backpackers, anglers, outfitters and people traveling on horseback.

In FY 95 the north half of the Forest hired wilderness rangers to administer wilderness areas. In FY 94 (and in previous years) trail crews in the wilderness had duties such as public contact in addition to their primary responsibilities. The Forest's backcountry team prioritized on doing wilderness administration and assigned one wilderness ranger and a volunteer assistant whose main responsibilities were that of wilderness rangers.

The south half of the Forest, which includes the Popo Agie, a portion of the Washakie and the Fitzpatrick wilderness areas, receives the greatest amount of wilderness use. Use allocation, including all wilderness uses, was completed for the Popo Agie. This was a major effort involving input from many people and was deemed necessary because of the heavy use and allocation problems which resulted from it. It is a popular area for a number of reasons including geology, accessibility and proximity to the town of Lander which is home to the National Outdoor Leadership School (NOLS). The Popo Agie and the south end of the Fitzpatrick receive year-round use including backpacking, horsepacking, backcountry skiing, and winter mountaineering.

The Popo Agie has been on a livestock use and group permit system for approximately 20 years. Permitting includes both commercial and institutional outfitters and all other organized groups. Permitting as a monitoring tool proved invaluable in the Popo Agie Wilderness use allocation process and continues to be invaluable in monitoring livestock use.

Wilderness guards, volunteers, partners, permittees, trail crews and the general public are utilized to monitor wilderness use on the south end of the Forest. Information is used by information receptionists to provide the public with the most current conditions, potential problems (high water crossings, bears in the area, etc.) and overall conditions. Efforts are made to direct public use to alternative areas or away from areas of high use. Wilderness guards and trail crews make public contacts and assure resource protection is occurring. All of the major trailheads to the Fitzpatrick and Popo Agie Wilderness areas have registers to monitor wilderness use.

The Geographical Information System (GIS) developed for the grizzly bear recovery area (see discussion under Recreation) includes all trails, backcountry campsites, outfitter camps, as well as dispersed human use polygons. The database was completed for the Beartooth and most of the North Absaroka wilderness areas in 1995. The remainder of the North Absaroka and most of the Washakie wilderness areas will be completed in 1996.

Again, this database includes not only the location of these features, but dates and levels of human use. It contains the current best information available and will provide the basis for monitoring future changes in human use.

**Evaluation**

In general, wilderness use on the Shoshone Forest is steadily increasing. On the north end summer use and, in particular, horse use is on the rise. On the south end overall use is increasing. Except for the Popo Agie, which has a permitting system that provides use data, it is difficult to quantify wilderness use accurately given present funding and staffing levels. Wilderness permits are a monitoring tool being considered. A permitting system for wilderness areas would give the Forest better use data, allow the Forest to redistribute use for a better quality experience, give wilderness users information on where other users are and facilitate education on issues such as the Grizzly Bear and low impact camping. However, permits are a controversial issue because some members of the public view them as regulatory. More dialogue will occur before a decision is made.

One approach to more efficient management of wilderness areas is the single unit management approach which the Forest Service is adopting. What this means is that wilderness areas that cross ranger district or national forest boundaries and are managed by the administrative unit within which they happen to lie will instead be managed as a single wilderness. On the Shoshone, the north zone recently began administering the Washakie wilderness even though a portion of it is on the Wind River district on the south zone. The Shoshone contributes money to the Gallatin National Forest in Montana for administering the Absaroka-Beartooth Wilderness. The Gallatin in turn handles, trail maintenance, public contact, and use monitoring. Since 1994, personnel on the south half of the Forest have made an effort to work more closely with the Bridger-Teton National Forest on single-unit management of the Bridger, Popo Agie, and Fitzpatrick Wilderness areas. Both Forests are also beginning discussion on the feasibility of a permitting program for the Wind River Mountains in the future. Single unit management eliminates the need for some of the coordination between units and simplifies the process somewhat.

**2. Campsite Condition**

This monitoring item is closely tied to the previous one. The Forest Plan recommended Frissell inspection as the technique to monitor wilderness campsite use. However, application of this method has been unworkable in wilderness areas and the modified Cole methodology is preferred (see Dispersed Recreation Use/Dispersed Campsite Condition discussion under Recreation heading). Campsites in wilderness areas that receive heavy use are the most impacted ones. For example, campsites in the Popo Agie wilderness were almost all surveyed by NOLS volunteers in the late 1980s. They found some of the same problems which occur in heavily used dispersed recreation campsites. Many campsites were exceeding Forest Plan standards and guidelines. This is part of what drove the use allocation process and subsequent permitting system.

Campsites in other wilderness areas on the Forest are not systematically monitored due to budget constraints although ranger district personnel are aware of where the majority of the problems are. On the north end of the Forest the largest impacts occur during hunting season when use is concentrated. On

the south end use is relatively steady year long. It is certain that a number of campsites are in poor condition. Wilderness Implementation Schedules address many of these problems but unless funding improves they will not be fully implemented.

**Evaluation**

As mentioned before, one alternative being discussed is a permitting system for the Forest wilderness areas to redistribute use and allow areas some recovery time. Another approach is education and interpretation. The latter is already occurring to a certain extent although a more aggressive program is needed. Volunteers and organizations such as NOLS and Backcountry Horsemen will continue to be enlisted as budgets become smaller.

## VISUALS

### Adopted Visual Quality Objective (VQO)

The Forest Service Visual Resource Management (VRM) system was developed Forest Service-wide to enable managers to integrate landscape management principles into multiple-use resource planning and management. The VRM system outlines procedures for managers to identify and classify the visual characteristics of the major landscape types which make up the Forest. A Forest manager can use this system to assess the visual effects of management activities.

Visual quality objectives (VQO) describe the acceptable degrees of alteration allowed in the natural landscape (Shoshone Forest Plan, FEIS, Vol.I, page VII-35). This monitoring item was intended to ensure that implementation projects meet VQO or that corrective action, such as mitigation, be initiated when it appears a project may not meet VQO.

VQO are monitored at the project-level and are attained through project implementation. Projects are monitored for VQO compliance on the Shoshone Forest through the National Environmental Policy Act (NEPA) environmental analysis process. If project level analysis shows that an existing VQO, as identified in the Forest Plan, is not going to be met by the proposed action two options are available. First, if the VQO is inappropriate for the project area a Forest Plan amendment can, through the NEPA process, change the VQO. Second, if the visual analysis shows that the VQO is appropriate for the project area but is not being met (or is not going to be met), mitigation measures must be taken to meet the VQO in a minimum amount of time. Timeframes for meeting VQO vary between individual visual quality objectives.

#### Evaluation

Development of a new Scenery Management System has recently been completed. Although many of the basic concepts of the old visual management system remain intact there has been a great deal of change in some of the quantitative analysis, most notably, a stronger tie to ecosystem management principles. The addition of landscape character descriptions, developed by using information based on ecological land units and land use patterns will provide a stronger basis for analyzing the existing scenic condition of an area (Integrity). Cultural features and existing land use patterns are essential to determining a "sense of place" that is often critical to our visitor's experience. Lastly, the new system ascribes to a much stronger use of constituent information as a foundation for understanding and identifying valued attributes, character, and integrity of the landscape.

Between 1992 and 1996 the visuals for the North Fork Corridor Plan on the Wapiti District were studied in preparation for the new highway construction. All highway design planning was accomplished with regard for visuals. The State Highway Department contracted with a firm to project future design conditions through visual simulation so that the new highway would meet VQO.

In 1994, two Forest employees were trained and educated in the new Scenery Management System. In 1995, implementation of the new system began with the East Fork Integrated Resource Inventory. Beginning stages of landscape character descriptions, scenic attractiveness, existing scenic integrity, and desired future integrity were completed for this analysis area.

In 1994/95 photographic monitoring points were established in the Lodgepole drainage on the Clarks Fork District within the proposed Lodgepole II timber salvage sale boundary. These points will be used to evaluate the success of proposed mitigation in obtaining the specified visual quality

objectives for that area. Because much of the Crandall area was burned in 1988, photographic points were intentionally set at both the small scale and at the full landscape or viewshed level. Photographs of the viewshed will be useful in monitoring the effects of large fires on visual quality over time.

## CULTURAL

### 1. Compliance with Cultural Resource Regulations (36 CFR 800) (43 CFR 10) (36 CFR 296)

The Forest is required to comply with cultural resource regulations for cultural resource protection. During 1994 and 1995, the Forest consulted with the Wyoming State Historic Preservation Office (SHPO) under 36 CFR 800 on the following projects:

3 Timber/Fuelwood sales
5 Range projects including permit renewal agreement
3 Wildlife projects
4 Recreation projects
3 Right of Way projects
4 Special Use projects (associated with highway work, etc.)

These figures do not reflect notification of SHPO for projects which did not result in or require consultation.

Also under 36 CFR 800, the Forest consulted with the Advisory Council on Historic Preservation (ACHP) on two projects dealing with National Register eligible properties.

Under the Native American Graves Protection and Repatriation Act (NAGPRA) (43 CFR 10), the Forest is coordinating information with institutions presently curating items from federal lands. This included review of institutional summaries of human remains and items defined in NAGPRA as subject to requests by tribal entities.

Under the Archaeological Resources Protection Act (ARPA) (36 CFR 296), testing and/or data recovery projects were conducted as part of three projects associated with construction of the Cody-Yellowstone Highway and two projects related to the Bruce's Bridge replacement near Lander.

### 2. Protection of Properties Eligible or Potentially Eligible for the National Register.

The Forest monitors all properties on the National Register of Historic Places for which it is responsible. There are properties located on the Forest for which other agencies are responsible.

Twenty five previously identified sites were monitored during 1994 and 1995. This involved examination of sites for evidence of unauthorized excavation, incidental damage from other activities such as recreation, and damage from natural processes such as erosion. Monitoring of some sites shows continued problems with vandalism although much of it is older. Overall the situation is improving and incidents of apparent new vandalism are decreasing. Education and public attention and awareness have helped the situation.

Roughly 18 public education projects were conducted during 1994 and 1995 including 4 interpretive displays, 6 school visits, 3 public presentations, and 3 school field trips.

#### Evaluation

At present the concern is that vandalism or looting is occurring at sites which have not yet been located or recorded by the Forest program. The potential is highest in remote locations where individuals outside the agency often have more direct knowledge of resources in the area. Increased

survey in these areas would allow assessment of resources present and increased presence would reduce the opportunities for vandalism or theft of artifacts.

Monitoring of such properties as the historic Anderson Lodge on the Greybull District resulted in a project to stabilize and restore the building. The project was completed in 1993 with assistance from the Sierra Club, Passport in Time volunteers and the SHPO in Cheyenne. The major economic contribution came from the Forest Service. Steadily declining budgets will make projects like this one less feasible in the future.

Despite the need for increased monitoring and law enforcement involvement, it has been shown that increased public awareness, public contacts and school programs provide the biggest payoff in the protection of cultural resources. These practices should be continued and expanded to further protect cultural resources whenever possible. Pursuing "Site Steward" agreements with American Indian tribes and other interested publics could provide additional monitoring of sites and in appropriate instances, on-site interpretation opportunities.

Volunteer programs and public education require substantial time, commitment and effort from Forest personnel, as do attempts to locate and develop funding from external sources for such projects as the Anderson Lodge restoration. At present the Forest program consists of one full time archaeologist responsible for the Forest program of work. This primary duty in addition to budget constraints, therefore, places a limit on the amount of external coordination that can occur. History and paleontological responsibilities as well as consultation and coordination with American Indian tribal governments on cultural and other issues are included in the workload. Additional staffing on the Shoshone's south end would move the Forest closer to successfully meeting program goals in protection and public benefit.

## THREATENED AND ENDANGERED SPECIES

### 1. Preventable Grizzly Mortalities

The Greater Yellowstone Area (GYA), which includes the Shoshone National Forest, is home to one of the larger populations of the threatened grizzly bear in the lower 48 states. The Endangered Species Act requires special protection and management on Federal lands. The Forest Service is committed to help achieve the bear's recovery and works actively with other agencies towards this goal (**Interagency Grizzly Bear Guidelines**).

One direct way to assist recovery is to prevent bear mortalities whenever possible. Although the Shoshone Forest Plan included this monitoring item, it is a goal for the entire ecosystem regardless of land ownership. The Forest Plan identified a limit for preventable grizzly bear mortalities of 6 bears for the GYA to be monitored on an annual basis. However, since the Forest Plan was implemented (1986), the Yellowstone Ecosystem Grizzly Bear Management Subcommittee of the Interagency Grizzly Bear Committee has recommended, and the U.S. Fish and Wildlife Service has adopted, revised recovery monitoring criteria. Shoshone National Forest officials, as members of the Yellowstone Subcommittee, have played an active role in formulating the revised monitoring criteria.

The 1993 Recovery Plan (U.S. Fish and Wildlife Service) established a number of parameters to be monitored for determining recovery within the GYA. Criteria for recovery include a limit on grizzly bear mortalities that applies to all jurisdictions within the GYA. Known human-caused mortality is not to exceed 4 percent of the population estimate calculated on a 6-year running average.

In 1994 total mortality in the GYA from known human causes was 10 bears. Three of them were adult females. Two of those mortalities occurred on the Shoshone National Forest. In 1995, the total mortality from known human causes was 17 bears. Seven were females and 3 of the 7 were adult females. Females of reproductive age are noted because they are particularly important to recovery. Five of these mortalities occurred on the Shoshone. The 6-year average mortality limit in the GYA (based on 4 percent of the estimated population) was 8.2 bears for the 1989-94 period, and 6.9 bears for the 1990-95 period. Methods for estimating populations are documented in the **1993 Grizzly Bear Recovery Plan** (U.S. Fish and Wildlife Service). The known human-caused mortality for the 1989-94 period represents a 6-year average annual mortality of 4.5 bears which is under the 8.2 bear mortality limit. The comparable mortality figure for the 1990-95 period on the other hand, represents 7.1 bears which is above the 6.9 average annual bear mortality limit.

The mortality figure for the past six years (1990-95) represents the first time since the development of this monitoring criteria that the mortality limit has been exceeded. The high number of mortalities in 1995 were caused by a number of factors. Three bear deaths in Yellowstone National Park were caused by a downed power line. On the Forest at least two bears were killed by hunters. The circumstances surrounding a third possible Forest mortality are still under investigation (a radio collar was turned in). Several bears in both 1994 and 1995 were removed from the GYA by responsible agency officials because they accessed human foods or caused property damage on public or private lands. Many of these bears became habituated to human foods during 1994 which was a very poor year for natural bear foods.

#### Evaluation

Known grizzly bear mortalities in the GYA have been on a downward trend during the past decade. The population appears to be expanding and moving towards recovery. However, 1995 was not a good year for grizzlies in the GYA with over a dozen dead and several removed to zoos or other

areas outside the GYA. The Forest does not believe the high levels of mortality in 1995 were due to a lack of effort to minimize mortalities. Rather a number of factors combined to result in higher mortality. The Recovery Plan states that mortality limits cannot be exceeded during any 2 consecutive years for recovery to be achieved. If mortality limits are exceeded again in 1996, efforts will be increased by the Forest and others in the GYA to reduce human caused mortality. It should be noted that mortalities will likely continue to increase somewhat with an increased grizzly bear population. However, the goal will still be to have mortality levels at or below the limit set in the recovery plan unless it is determined after careful review and consideration that the population can sustain a higher mortality level and still achieve other recovery criteria.

Ecosytem-wide, hunter related bear mortalities are an issue. On the Shoshone at least 2 and possibly 3 of 5 were hunter related. Much time, effort and money is spent on hunter information/ education, bear mortality prevention patrols, and enforcement of food storage orders to minimize human/bear encounters during hunting season. Yet more can be done to educate hunters and outfitters on prevention of grizzly mortalities. Efforts on the Shoshone to educate the public will be increased in 1996 and human caused mortalities will be closely monitored.

**2. Compliance with Grizzly Guidelines**

At the time the Forest Plan was signed, the **Guidelines for Management Involving Grizzly Bears in the Greater Yellowstone Area** were in effect. They were adopted by the Forest Service, National Park Service, U.S. Fish and Wildlife Service and the states of Montana, Idaho and Wyoming in 1980. In 1986 four changes were made to the Guidelines and the Interagency Grizzly Bear Committee approved application of them on National Forest System, Bureau of Land Management, and National Park System lands throughout grizzly bear ecosystem areas in Idaho, Montana, Washington and Wyoming. They became known as the **Interagency Grizzly Bear Guidelines.** The Guidelines divide bear habitat into five management situations in order of importance to the bear's recovery. The Shoshone National Forest contains Management Situations 1 through 3 (See Land and Resource Management Plan, Chapter II, page II-50). No Situation 4 habitat has been identified on the Forest and Situation 5 habitat are areas of significantly lower value or priority for grizzly habitat management.

The major objectives of the Guidelines are:

To maintain and improve habitat;
To minimize grizzly-human conflict potential;
To resolve grizzly-human conflicts.

Compliance with Grizzly guidelines is incorporated into the Shoshone National Forest's annual program of work. Education of Forest users and the public in general is the cornerstone of the grizzly bear recovery effort. Every year the Forest disseminates considerable information concerning areas of high seasonal bear activity, identification, behavior, foods, and measures to prevent or minimize grizzly/human conflicts. Information is made available at Forest offices, trailheads and campgrounds and is included in mailings to potential visitors and hunters. For the last three field seasons (1993-1995) the Forest has had interpreters working the North Fork corridor - one of the most heavily used areas of the Forest by both people and grizzlies - which connects the town of Cody to the east gate of Yellowstone Park. Most of the Forest's permitted lodges are located along this corridor as well as the bulk of the developed campgrounds. Grizzly bears are common along this corridor especially closest to the Yellowstone Park boundary. Interpreters give talks at campgrounds and lodges on a regular basis during the summer. Topics include grizzly bear information. Placemats containing grizzly bear information were printed in 1995 and distributed to lodges to help educate visitors.

A special order requiring that all human foods and other attractants be kept unavailable to bears is strictly enforced. The order has been implemented in all areas of the Forest that receive consistent use by grizzly bears. Monitoring of grizzly bear activity resulted in an increase in the area of application in 1994 to include portions of the Greybull and Wapiti Districts outside the recovery zone. Application of the special order will follow the expansion of the grizzly bear as it moves into new areas on the Forest.

Throughout the field season, compliance officers sweep campgrounds and lodges on a regular basis to assure that visitors are complying with food storage and other bear-related regulations. In the fall, Forest employees participate in hunter patrols in both the front and backcountry. Hunters receive information packets which include bear literature. Camps and trailheads are inspected for bear attractants and food storage compliance. Hunter patrols are considered a high priority on the Forest. Permanent employees are often reassigned to this task at the expense of other ongoing or previously planned work. In 1994, a very poor food year for bears, the Forest initiated an incident command system, similar to that used for wildfires, to deal with anticipated increases in bear/human conflicts.

Signs are posted at major travel corridors alerting travelers that they are entering grizzly country. Warning signs are also utilized where temporary situations exist such as livestock or wildlife carcasses, gut piles, unusual bear activity, etc.

Classroom presentations are given at local schools on various aspects of the National Forest. Youngsters learn about the habits of the grizzly and how to behave when visiting grizzly country. The Forest Service and the Wyoming Game and Fish Department conducted public workshops in 5 communities around the GYA in 1995 to educate forest users on the proper behavior in bear country. Additional workshops are scheduled in 1996 and beyond.

Food storage compliance is facilitated through widespread use of bear resistant boxes and bear poles for storing food at both developed and dispersed campsites as well as numerous backcountry locations. Twenty new bear poles were installed in both frontcountry and backcountry locations on the Greybull District in 1994 and 95.

Bear resistant dumpsters are in use throughout the Forest. In 1995 all dumpsters were reviewed for effectiveness and upgraded or replaced as necessary. The Forest helped lodge owners in the North Fork corridor upgrade their bear resistant facilities. Steel posts were installed at each lodge so that dumpsters could be anchored to prevent bears from tipping them over.

Bear resistant panniers and backpacker tubes are available at the Clarks Fork and Wind River Ranger District offices for use by the public when traveling in bear country. Several sets of bear resistant panniers are also available for use at the Clarks Fork District office.

The Forest works closely with the Wyoming Game and Fish Department to document all grizzly bear/human and grizzly bear/livestock conflicts and to eliminate the cause. The location, cause and result of all conflicts are documented and summarized in an ecosystem wide report coordinated by Yellowstone National Park. This report, which includes recommendations for resolution, is reviewed at the fall meeting of the Yellowstone Ecosystem Grizzly Bear Manager's Subcommittee (YES).

All activities authorized, funded, or carried out by the Shoshone Forest are reviewed to determine the effect they may have on grizzlies and their habitat. This includes an examination of potential cumulative effects as well as individual project effects. When it is determined through this biological evaluation process that activities may affect grizzlies or their habitat, consultation with the U.S. Fish and Wildlife Service occurs. Coordination is also conducted with other knowledgeable parties, such as biologists with the Wyoming Game & Fish Department, to arrive at actions compatible with the grizzlies well-being and recovery

objectives. Grizzly bear clauses, as identified in the Guidelines, are included in all special use permits, grazing permits, contracts, etc. issued for activities in grizzly habitat on the Forest.

**Evaluation**

The Forest is complying with the Guidelines and will continue to do so. We believe cooperative efforts towards managing grizzly bears and their habitat are making positive contributions to the recovery goals.

**3. Grizzly Habitat Effectiveness**

This monitoring item required the Forest to monitor grizzly bear habitat effectiveness and to correct deficiencies in compliance prior to the second decade after the Plan was published (1986). The Forest Plan specified the Grizzly Bear Cumulative Effects Model (CEM) as the tool for measuring grizzly habitat effectiveness. Forest Plan amendment 91-002 (1991) changed the data sources and techniques for monitoring this item from the CEM to the following:

- Interagency Grizzly Bear Guidelines
- Grizzly Bear Recovery Plan
- Yellowstone Subcommittee Reporting System Task Force
- Consultation Procedures
- Biological Evaluations

That same amendment changed the allowable variability for compliance with deficiencies identified through monitoring from the second decade after release of the Forest Plan (1986) to "as soon as practical."

Habitat effectiveness is a measure of the degree to which an area of habitat is producing the desired results given its capability. In this instance, habitat effectiveness represents the degree to which grizzly bear habitat on the Forest is contributing to the overall goal of grizzly bear recovery. This parameter is considered with respect to individual project proposals as they are evaluated, as well as for the entire area of Shoshone Forest grizzly bear habitat. The latter is often done in conjunction with the annual deliberations of the Yellowstone Ecosystem Grizzly Bear Management Subcommittee. Data from various monitoring efforts, as well as professional judgements are used to assess overall habitat effectiveness for the entire Forest and for specific projects. Progress in achievement of recovery objectives will ultimately serve as the barometer for overall habitat effectiveness. In this regard, progress towards achievement of recovery goals in general, and the apparent increase in area of use, population size, and reproduction (females with cubs) on the Forest all point in the direction of positive habitat effectiveness. The exception is the recent one year increase in mortality as noted previously.

The Forest is currently utilizing the CEM in the Crandall/Sunlight Bear Management unit to obtain a quantitative assessment of habitat effectiveness in that area. It is likely that as the validity, utility, and flexibility of that model increases, additional use of this tool in conjunction with the existing tools identified above will be made to better assess grizzly bear habitat effectiveness in relation to ongoing or proposed Forest activities.

A positive step towards maintaining Grizzly habitat effectiveness was the policy adopted by the Forest in 1994 of "no net increase in roads." Roads were identified as significant factors in cumulative impacts to bears and other resource values. Approximately 25 miles of road were obliterated in 1994-95 in the grizzly bear recovery area.

**Evaluation**

Grizzly habitat on the Forest appears to be stable. Grizzly bears seem to be expanding in numbers and distribution on the Forest. The Forest has done an adequate job of assessing the impact of projects on habitat effectiveness at the site specific level, as well as the Forest as a whole, given the assessment tools readily available. However, the Forest has not had the capability to assess habitat effectiveness quantitatively.

The CEM has been under development on the Shoshone for several years and is scheduled for completion in FY 96. It is the tool of choice for quantitatively assessing the status of grizzly habitat throughout the GYA for large areas such as the entire Yellowstone recovery zone, or relatively large subunit areas such as Forest Ranger Districts. The ability to quantitatively address cumulative effects using the model is of particular value for comparison purposes. Currently the model is being run on the Sunlight/Crandall bear management unit on the Clarks Fork District. When fully operational the CEM will allow a more accurate quantitative assessment of habitat effectiveness.

One of the greatest threats to habitat effectiveness in the GYA is increased private land development and subsequent increased demands on public lands. The Forest, in cooperation with other forests and agencies in the GYA, is currently developing a long term strategy for conservation of the bear. Monitoring of private land development and increased use of public lands will be part of that strategy.

The Forest is cooperating in efforts through the Interagency Grizzly Bear Committee to develop GYA-wide standards for road density and core area (areas free of roads and high use trails) that will help ensure the maintenance of habitat effectiveness for the grizzly bear.

**4. Black Footed Ferret Surveys**

The black-footed ferret is a Federally listed endangered species. There is no evidence of residence on the Shoshone although the only wild ferrets known to exist in recent times were found 3 to 5 miles from the Forest boundary near the town of Meeteetse, Wyoming. The Shoshone contains a few scattered prairie dog towns which may be considered potential black footed ferret habitat.

An outbreak of sylvatic plague spread through the prairie dog towns near Meeteetse in the mid 1980's threatening the remaining black-footed ferret population. The Wyoming Game and Fish Department trapped and removed the remaining ferrets from 1985 through 1987. A captive breeding program was initiated in an effort to save the species from extinction by reintroducing animals back into the wild from the captive breeding program.

The U.S. Fish and Wildlife Service, in cooperation with other agencies and interested parties, conducts annual surveys of ferret habitat throughout Wyoming to test for sylvatic plague and to assess the feasibility of reintroduction. None of these surveys are conducted on the Forest because of the small amount and low potential of the habitat.

In past years, surveys were conducted on the Forest when management activities were proposed that might impact black-footed ferret habitat. The last proposed significant disturbance activity near such habitat on the Shoshone was the Exxon corporation's Carter Mountain exploratory well in 1989/1990. That application was ultimately withdrawn.

**Evaluation**

Potential black footed ferret habitat on the Forest will continue to be considered and surveys conducted as necessary whenever ground disturbing activities are proposed that could affect such habitat. The ferret is not known to reside on the Forest but reintroduction on adjacent lands is still a possibility.

**5. Wintering Bald Eagle Surveys**

The Shoshone National Forest does not have a large amount of existing bald eagle habitat. A few bald eagles winter on or near the Forest in some of the Forest's major drainages. No nests are known to occur on the Shoshone although Yellowstone National Park has a nesting population that is expanding and nesting on the Forest in the future is likely as recovery occurs.

The National Wildlife Federation coordinates an annual mid-winter survey of bald eagle populations across the country. Several Federal and State agencies and individuals are involved in the survey work for the area that includes the Shoshone. Surveys are conducted on State, Federal and private land. The Forest receives winter survey data and nest locations on adjacent lands annually, and uses the information to note population trends and guide management.

**Evaluation**

The number of bald eagles on or adjacent to the Shoshone is stable or increasing. It is probable that the expanding Yellowstone Park nesting population will move onto the Forest in the near future. Shoshone personnel will continue to monitor the status and trend of both the wintering and nesting populations on or immediately adjacent to the Forest. As with all other classified species, the Forest will contribute resources as necessary and appropriate to assist in the recovery of this species in the Greater Yellowstone Area. The status of the bald eagle was recently changed from endangered to threatened because of improved population and habitat conditions.

**6. Wolf Population Status**

The endangered gray wolf was reintroduced into Yellowstone National Park in January of 1995, providing renewed hope for recovery of this species in the Greater Yellowstone Area. These animals, and any other native wolves that could possibly remain in the area, are currently classified as "experimental" providing additional management flexibility. The fourteen animals relocated from Canada to Yellowstone Park were the beginning of an effort to reestablish gray wolves in western North America. This group is monitored as closely as circumstances will permit by the U.S. Fish and Wildlife Service. The Forest maintains contact with representatives of the U.S. Fish & Wildlife Service and the National Park Service regarding the status and location of the reintroduced wolves. In January 1996, additional wolves were relocated from Canada to Yellowstone Park to increase the ultimate chances to meet recovery goals for this species in the Yellowstone area.

**Evaluation**

The reintroduced wolves have made brief visits to the Forest in the process of exploring their new surroundings. Because the Forest has considerable desirable wolf habitat, in the form of migratory big game herds, it is probable that wolf use on the Forest will increase if the reintroduction effort is successful. In accordance with provisions of the Endangered Species Act and pertinent regulations, the Forest will be a cooperative partner in helping achieve recovery for this species.

**Additional Sensitive Species Monitoring**

**7. Yellowstone Cutthroat Trout**

Yellowstone cutthroat trout (YSC) are included on the Rocky Mountain Region's (Region 2) sensitive species list. Due to past introduction of exotic and non-native fish species, habitat modification/ degradation, and past over-fishing, YSC have been reduced to a fraction of their historical range. As a result, WG&FD initiated a study to determine the current distribution and habitat used by YSC. The Shoshone Forest entered into a partnership with WG&FD to have a University of Wyoming Cooperative Fisheries Unit graduate student conduct the survey and monitoring work on the Forest.

During 1994 work was focused on the Greybull and Wood River drainages on the Greybull District. They found that YSC have hybridized with previously stocked Snake River cutthroat trout.

**Evaluation**

No evidence of hybridization with rainbow trout was found on the Forest. Cutthroat trout were almost exclusively found in streams with a gradient of less than 9 percent. Due to the high and extended runoff during 1995, research was delayed in the North Fork Shoshone drainage. This is part of an ongoing cooperative project to determine the status of YSC in the Wyoming portion of the Yellowstone Basin.

While monitoring the status of various streams in the Soda Butte drainage in conjunction with the proposed Noranda Mine, fisheries biologists in Montana found some westslope cutthroat trout that are non-native to the drainage. Because of the concern for the potential spread of westslope cutthroat into historic YSC range, a cooperative effort to sample tributaries and determine the genetic status throughout the Soda Butte Creek drainage was conducted during 1994. It involved biologists from Yellowstone National Park, Montana Department of Fish, Wildlife and Parks, Wyoming Game and Fish and the Gallatin and Shoshone National Forests. No fish were found in Hayden or Republic Creeks on the Shoshone National Forest due to natural barrier falls located downstream off the Forest.

## WILDLIFE AND FISH

### 1. Cavity-Dependent Species Habitat

A number of species of birds and mammals on the Shoshone National Forest depend on tree cavities as a part of their habitat for survival. Availability of this type of habitat is related to the availability and distribution of various species of trees in mature or late successional forests. Monitoring of cavity dependent species habitat is designed to ensure this habitat component is maintained as a part of the overall diversity of vegetation and wildlife habitat on the Forest.

Some monitoring of cavity dependent species habitat occurs at the project level in conjunction with implementing ground-disturbing management activities such as timber sales, and road building projects. Surveys are currently planned for monitoring cavity-dependent habitat on the Ellsbury and other timber sales on the Clarks Fork District as well as currently planned timber sales on the Wind River District. Lack of full Forest Plan level funding and personnel, and problems with the vegetation data base have prohibited more extensive monitoring of cavity habitat. When this item was placed in the monitoring section of the Forest Plan, it was anticipated that analysis and evaluation of remotely sensed and computer analyzed vegetation data could and would be developed to help monitor this item. In addition, it was thought that analysis of data previously gathered for timber management purposes would be more useful in monitoring this item. However, both have presented unanticipated problems preventing their rapid development and use as a simple, reliable monitoring method.

Cavity-dependent species habitat was addressed to some degree in the Forest Plan through the standards and guidelines which require the Forest to provide, at a minimum, an average of 20-30 snags (with a minimum diameter which varies by tree species) per 10 acres in treated areas within forested diversity units. This is required where biologically feasible. Snags are to be in all stages of development. There are also provisions for down-dead logs to be left after vegetative treatment has occurred where biologically feasible. These guidelines are written into timber purchaser contracts and are considered and applied to all timber sale areas where feasible.

#### Evaluation

Comprehensive monitoring of this item is probably not feasible or perhaps necessary except in certain situations, such as when sensitive species are at issue. The existing and anticipated land uses on the Forest reduced the need for detailed, comprehensive monitoring of this item. Of the 2.4 million acres that make up the Shoshone, almost 1.5 million are forested. Of the forested acres 86,000 acres or 6% are in the timber suited base. The ground disturbing activity most likely to affect cavity habitat is vegetative management which, for the most part, occurs on the 86,000 acres. The average annual allowable sale quantity of timber anticipated from these lands has recently been reduced from 11.2 to 4.5 million board feet per year. Therefore, potential adverse impacts from vegetative management activities are relatively small. Where vegetative management does occur, Forest Plan standards and guidelines provide a safety net for cavity habitat protection.

Approximately 60% of the Shoshone land area is in classified wilderness areas. While much of the wilderness areas are non-forested lands, those that are forested are generally in a mature or over mature successional stage.

## 2. Winter Range Carrying Capacity

Winter range trend and condition on the Shoshone are monitored by the Forest in conjunction with the Wyoming Game and Fish Department (WG&FD) and other interested parties. Over a period of many years, the carrying capacity on contiguous winter ranges occurring entirely or partially on Forest lands are estimated by comparing range condition and trend with big game population estimates. Annual interagency meetings are held in January/February each year with the Bureau of Land Management and the Wyoming Game & Fish Department to discuss observations and data collected during the past year and to consider adjustments as necessary. In addition, coordination and consultation occurs among interested agencies and parties at other times, such as during the formulation of the Forest Plan or revisions, or when changes are proposed in big game herd unit population objectives.

During the past year (1995) observations and habitat condition and trend data were collected for the Squaw Creek, Dick Creek, Sunshine, Timber Creek, Bear Creek, Whiskey Mountain, Ishawooa Hills, Bench, and Ghost Creek livestock grazing allotments. This data has been used to help formulate alternatives in environmental documents for these allotments. Additional monitoring for some of these and other allotments is scheduled for the coming summer.

In a long-term sense, the Forest determines what domestic and wildlife grazing use the land is capable of supporting based on inspection of allotments at different times of the year, and comparing condition and trend with estimated big game population numbers. The WG&FD sets herd unit objectives (or population objectives for big game herds) for big game species, such as elk, deer, and sheep, based on an estimated carrying capacity. They also estimate herd sizes using annual aerial or ground survey methods. Population estimates are compared to the herd unit objectives for a determination of whether numbers are over or under objective, and the relationship of the existing population to the condition and trend of the habitat that is being affected.

### Evaluation

Analysis of livestock grazing allotments, and an update of Allotment Management Plans (AMP's) is currently occurring on the Shoshone as part of a range program environmental analysis effort. Preliminary findings indicate that some winter range areas on allotments may be receiving overuse by livestock, wildlife, or both. One allotment of concern, for example, is the Ishawooa Hills area of the South Fork Shoshone River drainage on the Wapiti District. Shrubs in some riparian areas were determined to be moderately to severely hedged due to current and past use. As a result of this and other monitoring, the preferred alternative in the environmental document recommends some changes in livestock use for the allotment. Recommendations are also made to reduce elk numbers which are currently over population objective in this herd unit. Monitoring conducted this past summer (1995) was used in a similar manner for other allotments. Additional monitoring is scheduled for the coming field season.

Monitoring of elk and livestock use on winter range areas of the Bear Creek Allotment occurred during the past three field seasons (1993-95). Preliminary findings indicate present numbers of and use by both elk and livestock are generally compatible.

## 3. Wildlife and Fish Habitat Improvement (Structural and Non-structural)

### Wildlife Habitat Improvements

The Forest Plan projected improvement outputs of approximately 550 acres annually from 1986 through 1990 and approximately 480 acres from 1991 through 2000. After the Plan was implement-

ed (1986), there was an over accomplishment of annual habitat improvements for several years. However, during the past five years, there has been an under accomplishment of wildlife improvements due to a shift in Forest priorities.

In 1994, non-structural wildlife habitat improvements were accomplished on 70 acres. In addition, 10 structural improvements were accomplished in FY 95 as well as the reconstruction of 3/4 miles of fence to allow safe passage for migrating elk. On the Shoshone National Forest, non-structural improvements generally involve retarding plant succession in some manner such as burning with prescribed fire, cutting tree overstory (usually Aspen) to encourage resprouting, or decreasing conifer encroachment into riparian or other important habitat areas. Structural improvements have included such things as constructing nesting platforms for species like trumpeter swans, and installing gates for closures on roads to provide habitat security.

**Evaluation**

During the first five years of the first decade (1986-90) of implementing the Forest Plan the rate of implementing wildlife habitat improvement projects was well above the average annual rate of accomplishment projected in the plan. In addition, the Clover Mist and Unit 40 wildfires of 1988 retarded plant succession and created considerable diversity in some areas on the Clarks Fork, Wapiti, and Wind River Districts. These factors combined with an increasing biologist workload and a shift in Forest priorities resulted in few improvements proposed or accomplished during the 1991-95 period. In addition, wildlife staffing on the Forest was reduced by nearly 50% during the last half of the decade (1991-96). It is anticipated that in the future the Forest will increase the level of improvement accomplishments, with additional emphasis on collaboration with other interested partners.

**Fish Habitat Improvements**

**Pilot Creek Project**: The Pilot Creek Enhancement Project was worked on in 1993 and 1994 and encompassed about 600 feet of stream bank on the Clarks Fork district. A heavily eroded, unvegetated streambank and access road to a dispersed campsite on the Clarks Fork River near Pilot Creek resulted in excessive fine sediment deposition into the Clarks Fork River (See discussion under Dispersed Recreation Use and Experience heading in Recreation section). This high sediment input adversely affected fish habitat, especially spawning and rearing. The stream bank erosion was caused in part by the natural migration of the stream bed in combination with the lack of bank-stabilizing vegetation. Past development of the access road had removed bank vegetation. Also, soils had been heavily compacted from vehicular traffic. The project included mechanically recontouring about 300 feet of stream bank and scarifying and blocking the old access road to vehicular traffic with large boulders. The eroding banks were replanted with grasses and willow shoots to help stabilize the stream bank. A sign was installed informing the public of the project and why it was conducted. The Pilot Creek Enhancement was a cooperative project between the Bighorn Chapter of Trout Unlimited, Wyoming Department of Game and Fish and the Shoshone National Forest.

**Evaluation**: Follow-up annual monitoring has included vegetative transects and photographs documenting vegetative establishment and bank stabilization each spring and fall. At this point, grasses have become well established. Willow cuttings are established and have had a high survival rate but are browsed heavily, apparently by moose. As a result, the stream bank has been stabilized and sediment input into the stream has been reduced thereby improving fish habitat conditions.

**Horse Creek**: The Horse Creek fish habitat enhancement project was a cooperative effort between the Wyoming Game and Fish Department and the Shoshone National Forest. The purpose was to

provide additional fish shelter and holding water for trout and to stabilize eroding stream banks on Horse Creek located on the Wind River District. Excessive fine sediment was entering the stream. This was caused by a variety of factors including road encroachment, stream migration, stream channelization and past livestock grazing. The enhancement includes the use of tree/rock structures and planting vegetation to increase shelter, encourage pool development and protect stream banks. Approximately one mile of stream was involved. The project included a detailed existing condition evaluation consisting of fish habitat, macroinvertebrates, water quality and fish populations to establish pretreatment conditions. Though work was completed in 1993, the monitoring portion of the project continues.

**Evaluation**: Annual follow-up monitoring by WG&FD and Forest personnel indicates that the project has been successful in providing desired fish habitat and stabilizing banks. Overall, instream structures remained in place with little erosion, even during the extended high water spring runoff in 1995. Per agreement, detailed follow-up monitoring and evaluation consisting of habitat, macroinvertebrate, fish population estimates and water quality parameters is scheduled to be conducted by WG&FD personnel with Forest assistance during 1996.

**Fiddlers Lake Aerator**: Fiddlers Lake, is a shallow eutrophic lake on the Washakie District along the Loop Road. Because of its location, high angler use and the fact it does not overwinter rainbow trout it is stocked by WG&FD on an annual basis. Annual stocking is expensive. Stocked rainbow trout do not achieve larger sizes due to the lack of oxygen during the winter which results in annual fish mortality. Due to the improvements on the Loop Road and developments in the campground that will attract more anglers, it was felt that a solar powered aerator could provide enough oxygen to overwinter fish, help achieve larger sizes and reduce the annual stocking.

The Bridger-Teton National Forest had a smaller aerator that the Shoshone was able to obtain. WG&FD felt its capacity needed to be increased and updated in order to overwinter rainbow trout in Fiddler's lake. As a result, additional equipment was purchased through a cooperative effort between WG&FD, Popo Agie Anglers and the Forest Service. The unit was installed and operated during the winters of 1993 and 1994.

**Evaluation**: WG&FD personnel found that the upgraded unit still was not providing enough oxygen to overwinter rainbow trout. Due to the additional expense required to further upgrade the system, personnel time to annually install, remove and ensure the unit was operating, and declining agency budgets, it was decided to remove the unit and continue stocking the lake on an annual basis. The unit was transferred to another lake off the Forest better suited for this type of system.

**Squaw Creek Culverts**: A county road on Squaw Creek, a tributary to the Clarks Fork River, runs through the Forest. Due to high runoff after the 1988 fires two culverts were washed out. Because of the emergency situation the County quickly replaced them with available culverts.

**Evaluation**: Initial monitoring during 1993 by the Forest Fisheries Biologist showed that one of the recently installed culverts resulted in a high fish jump with very high velocities and flow during spring runoff. As a result, many cutthroat trout that move out of the Clarks Fork River and lower Squaw Creek to spawn during the spring could not access upper Squaw Creek. Negotiations initiated by the Forest resulted in the county cutting off the downstream end of the culvert in the fall of 1994 to reduce the jump height and distance fish needed to travel through the culvert during high flows. Follow-up monitoring by Forest personnel in 1995 indicated that the jump height had been reduced and fish could navigate their way upstream during normal runoff. The Forest Fisheries Biologist feels, however, that the culvert is too small and installed improperly to function correctly during high run-off periods. Although the other culvert passes fish upstream during normal run-off, it was

installed improperly (too small and on a stream bend). Forest personnel have recommended the culverts be replaced or the road moved out of the stream bottom to avoid crossing the stream and eliminate the two crossings. Future priorities and funding will determine what course of action will be taken.

**4. Wildlife Habitat Diversity**

The Forest Plan recommends that wildlife habitat diversity be monitored either annually or as new projects are completed. This issue is examined and addressed with respect to pertinent standards and guidelines as specific timber sale and other projects are proposed for implementation. These standards and guidelines provide a safety net in areas of proposed human disturbance such as where timber sales are proposed. The Forest has chosen to monitor as new projects are completed due in part to the lack of an adequate vegetation data base. However, the forestwide soil and vegetation resource inventory effort is compiling data that will improve the vegetation data base. The capability of taking a more detailed look at this factor may be available after the inventory project is complete in the next year or two.

**Evaluation**

Although reductions in personnel and other Forest priorities have precluded detailed monitoring of wildlife habitat diversity, recent environmental analysis in support of the Oil and Gas amendment, the Allowable Sale Quantity amendment, Allotment Management Plans and other projects indicates that in terms of vegetation the Shoshone remains diverse. Of the total acres on the Forest that have vegetative cover of any kind and have been classified (1,985,911 acres), 34 percent are grass/forbs or openings, 7.5 percent are shrub/seedling, eight percent are sapling poles, 50 percent mature forest, and 1.5 percent old growth. The existing varied mix and intermingling of vegetation types on the Forest and inherent habitat diversity within these broad types helps explain why the Shoshone National Forest is a place of national renown for wildlife.

**5. Riparian Condition Rating**

The riparian ecosystem scorecard referred to in the Forest Plan was in development at that time but was never finalized and implemented. Various methods and procedures have been used to estimate riparian condition since then. In both 1994 and 1995 watershed field crews, and in 1995 range field crews, monitored riparian areas on numerous reaches of stream. They generally collected information on channel morphology, fine sediment, fish habitat, stream bank alteration by grazing ungulates, and ungulate forage use. Additionally, the range crew used a riparian evaluation guide developed by the Bureau of Land Management (**Assessing Proper Functioning Condition**) to determine existing riparian condition during 1995.

**Evaluation**

A total of 80 stream reaches were monitored during 1994 and 1995. Data is currently being analyzed to determine existing riparian condition.

**6. Population and Habitat Trends of Management Indicator Species**

Although it has not been possible to monitor this item in as much detail as was anticipated when the Forest Plan was developed, the Forest has monitored some management indicator species (MIS) to a varying degree of detail. However, the Forest has not been able to conduct systematic and comprehensive monitoring of all designated (MIS) due to limited resources.

The Shoshone National Forest Plan identified MIS to reflect management needs for the wildlife species inhabiting the Forest. They were categorized as Featured Species, those that are hunted, fished or trapped; Recovery Species, those that are State or Federally designated as threatened, or endangered; and Ecological Indicator Species, those that are dependent on specific habitat characteristics during some phase of their lifespan or are particularly sensitive to management activities. The following is a list of Forest MIS by category and rationale for selection:

**Featured Species:**

- Elk and Mule Deer - Economically important and public issue
- Bighorn Sheep - Economically important and public issue
- Moose - Limited habitat and economically important
- Mountain Goat - Unique and limited habitat

**Recovery Species**

- Black-footed Ferret - Endangered and environmentally sensitive
- Gray Wolf - Endangered
- Grizzly Bear - Threatened and environmentally sensitive

**Ecological Indicator Species**

- Pine Marten - requires habitat in late successional conifer stages
- Goshawk - sensitive to nesting area disturbance; needs large acreages of late successional conifer stages
- Brewers Sparrow - sagebrush communities
- Hairy Woodpecker - late successional aspen communities; snag dependent species
- Beaver - Special and limited riparian habitat that may be influenced by management practices
- Blue Grouse - Limited Habitat; population may be affected by vegetative treatments
- Ruffed Grouse - Multi-storied aspen communities
- Game Trout - Aquatic habitat

Featured and Recovery species on the above list are monitored by reviewing data collected by other agencies (WG&FD, BLM, etc.), by the Shoshone National Forest, or by others as part of a coordinated interagency effort. Ecological indicator species have not been monitored to the degree anticipated in the Forest Plan. All Featured Species are monitored annually through population and harvest figures collected by the Wyoming Game and Fish Department. Under the Recovery Species list, the grizzly bear is monitored annually by the Shoshone National Forest in conjunction with the other agencies in the Greater Yellowstone Area (see discussions under Threatened and Endangered Species heading). There is no evidence of black footed ferret residence on the Shoshone and thus monitoring efforts for this species have been abandoned except when significant projects are proposed in or near known prairie dog towns. Very few prairie dog colonies occur on the Forest. Most potential ferret habitat is found adjacent to the Forest. Reintroduced gray wolves are not yet residing on the Forest although this will likely change in the near future. The Forest does provide seasonal habitat for many big game species which provide the natural prey base for wolves. Potential wolf habitat will be re-addressed and analyzed in the upcoming Forest Plan revision.

The possible localized effects of habitat changes on Ecological Indicator Species are considered at the project level as ground disturbing activities are proposed and evaluated. Standards and guidelines contained in the Forest Plan provide a safety net for the well being of these species.

**Evaluation**

Monitoring is conducted for featured and recovery species, and for ecological indicators when and where significant disturbance projects are proposed. Limited budget and staffing levels force the Forest to focus more effort and attention on habitats than on individual species. This focus on habitat should be adequate to comply with the regulations until Forest Plan revision. It is recommended that monitoring needs for addressing the entire issue of indicator species be re-examined in the upcoming Forest Plan Revision. It should be noted that the Forest Service has published a proposed rule revising the forest planning procedures, including monitoring for wildlife. *See*, 60 Fed. Reg. 18886 (4-13-95) (proposed rule). Since a proposed rule has been published and plan revision does not begin until 1997, we expect a new rule to be in place prior to completion of the revision process.

**7. Additional Fisheries Monitoring**

**Jones Creek**: During the 1988 Yellowstone fires, Jones Creek, a tributary to the North Fork of the Shoshone River, was heavily burned. A partial fish kill was observed by WG&FD and Forest personnel just after the fires. As part of follow-up monitoring, WG&FD and Forest personnel sampled fish habitat and populations in the lower and upper portions of the Jones Creek drainages during 1993 and 1994 to determine their status after an extended period.

**Evaluation**

It was noted that although the drainage was severely burned, channel morphology was adversely impacted and had experienced heavy sediment input, the riparian vegetation and fish habitat had begun to stabilize. Population monitoring in Jones Creek indicates that trout had a high condition factor (weight to length ratio) and good densities for this stream type. It appears that the nutrient loading from the fire and current habitat conditions combined to provide favorable conditions for trout growth and recovery although the channel continues to adjust to increased water yields and will take many years to stabilize.

## RANGE

### 1. Grazing Use

Grazing use is considered the amount of forage used by permitted **commercial livestock** and **permitted recreation** livestock on the forest. It does not account for the amount of forage consumed by recreation visitor livestock.

**Commercial Livestock:** The Forest Plan listed the management practices (grazing in this case) and the proposed outputs for those practices in Chapter III (see table III-1, pages III-13 to III-14 for range projections). The Plan predicted an average annual output of 78 thousand animal unit months (AUM) for cattle and horse grazing and 25.4 thousand AUM for sheep and goats for the period of time between 1985 and 2000. Total Forest commercial livestock grazing was predicted to be 103.4 thousand AUM annually. A number of allotments (4 or 5) are no longer allocated for commercial livestock, hence the allocation for cattle and horses is 77.4 thousand AUM and that for sheep is 20.3 thousand AUM, or a total of 97.7 AUM.

Table 3 shows authorized commercial livestock use on the Forest for the last 10 years. Authorized non-use is grazing use offered but not taken by the permittee for personal reasons or for resource protection. Vacant allotments are available for grazing, but are not being grazed due to lack of demand from the livestock industry (mostly sheep) or because grazing permits have been waived back to the Forest Service and new permits have not yet been issued.

**Table 3: Actual Available Commercial Livestock Grazing Use (1,000 AUM)**

| Year | Cattle/Horse | % of Plan | Sheep/Goat* | % of Plan | Total | % of Plan |
|---|---|---|---|---|---|---|
| Plan | 77.4 | | 20.3 | | 97.7 | |
| 1986 | 54.6 | 71 | 3.5 | 17 | 58.1 | 60 |
| 1987 | 58.6 | 76 | 2.0 | 10 | 60.6 | 62 |
| 1988 | 56.4 | 73 | 2.3 | 11 | 58.7 | 60 |
| 1989 | 57.9 | 75 | 2.3 | 11 | 60.2 | 62 |
| 1990 | 64.3 | 83 | 2.3 | 11 | 66.6 | 68 |
| 1991 | 57.7 | 76 | 1.6 | 8 | 59.3 | 61 |
| 1992 | 49.1 | 63 | 0.9 | 5 | 50 | 51 |
| 1993 | 56.0 | 72 | 1.4 | 7 | 57.4 | 59 |
| 1994 | 53.6 | 69 | 0.4 | 2 | 54 | 55 |
| 1995 | 56.8 | 73 | 0.2 | 1 | 57 | 58 |

*** AUMs in this column represent sheep grazing use. No commercial goat grazing is occurring on the Shoshone.**

**Commercial Recreation Livestock**: Commercial recreation livestock use consists of stock grazed under outfitter and guide permits, livestock use permits, special use permits issued to lodges, crossing permits and other miscellaneous uses.

**Table 4: Actual Annual Commercial Recreation Grazing Use (1,000 AUM)**

| Year | Horse/Sheep |
|---|---|
| 1986 | 4.3 |
| 1987 | 3.8 |
| 1988 | 3.9 |
| 1989 | 3.7 |
| 1990 | 3.8 |
| 1991 | 4.2 |
| 1992 | 4.2 |
| 1993 | 3.3 |
| 1994 | 6.2 |
| 1995 | 1.6 |

**Evaluation**

Grazing use since 1986 for cattle and horses has been below what the Forest plan projected. Sheep grazing use has fluctuated since 1986 beginning with approximately 37,000 AUM in 1986 to a low of 13,000 AUM in 1995. Demand for sheep grazing has been down.

**2. Forage Utilization**

Allowable forage utilization is determined by applying the allowable use guides in the Forest Plan to the grazing system being implemented on the ground. Most of the allotments on the Shoshone are managed under a deferred rotation grazing system. Under this system, grazing is delayed or discontinued on a given area or unit of the allotment for a period of time to allow for plant reproduction, establishment of new plants or recovery of existing plants.

**Evaluation**

In 1995, utilization studies were completed on 27 allotments or 35% of a total of 77 allotments grazed. In general, during the 1995 grazing season, forage utilization did not exceed acceptable standards in any one allotment. In some instances, utilization for specific areas within allotments did exceed acceptable standards. The level of utilization within these areas was not representative of the average utilization within the entire allotment and did not exceed acceptable standards by more than 10% on the allotment.

**3. Range Condition and Trend**

Range analysis field exams were designed by an interdisciplinary team consisting of a range specialist, a fish biologist, a wildlife biologist, and a hydrologist. Field exams were conducted on 6 allotments by an interdisciplinary field crew in 1995. The purpose of the exams was to gather data on the allotments by reading existing established long term trend transects. In addition, the team established cover/frequency transects in these allotments for future trend monitoring that will be sensitive to vegetative composition changes over time. In the past 5 years two other allotments, Wiggins Fork and Bear Basin, have also had long term transects read. In these allotments, 90 Ecodata plots were established in 1994 and 50 in 1995 to assist in ecological classification. In 1995, a total of 8 allotments were inspected for condition and trend.

**Evaluation**

The data from work completed during the 1995 field season is not completely summarized, but preliminary findings indicate that, except in a few problem areas, overall conditions are improving. Resource conditions are moving toward the desired future condition. This positive trend can be attributed to improved management practices by permittees and to stocking levels which have been declining over the past several decades.

**4. Allotment Management and Permittee Plans**

The Shoshone Forest is currently involved in the permit issuance and allotment management plan (AMP) analysis effort. Environmental analysis is being conducted on a number of allotments where National Environmental Policy Act (NEPA) analysis is necessary. The Forest has focused on allotments where past monitoring indicated that some adjustment in the grazing system, level of permitted numbers, or season of use will help the resource move more rapidly toward the desired future condition than under present management. The analysis was initiated on 36 allotments in FY 95 which will result in decisions, AMPs, and permits on approximately 16 allotments in 1996.

The Forest Plan requires that allotment management plans and annual grazing instructions be reviewed and developed. The annual instructions specify the rotation schedule, number of livestock, the season of use and any other instructions or permit conditions that will assist in the management of the resource and implementation of Forest Plan standards.

**Evaluation**

In 1994 and 1995 AMPs were reviewed and updated. In 1995, environmental analysis was initiated on 36 allotments, or 41% of all livestock allotments on the Forest. Sixty four annual operating instructions were issued to 96% of Forest permittees.

## TIMBER RESOURCES

### 1. Allowable Sale Quantity

The Allowable Sale Quantity (ASQ) is the maximum volume of timber that may be sold from the suitable timber base during the planning period specified in the Forest Plan. The quantity is normally expressed as the "average annual allowable sale quantity".

In 1986 the Shoshone National Forest Land and Resource Management Plan was released. It set an ASQ of 112 MMBF over the ten year planning period or an average annual volume of 11.2 MMBF on a suitable timber land base of approximately 86,000 acres. Implementation and monitoring indicated that the volume per acre predicted by the Forest Plan could not be met. There were several reasons for this problem:

- The 1988 fires burned much of the Forest considered to be part of the suitable timber base.

- Actual timber volumes per acre coming off the Forest were lower than anticipated or assumed in the Forest Plan. Many stands, instead of being uniformly forested, have significant areas of rock outcrop, grassy openings, or other factors that reduce the number of productive acres or affect timber yield projections.

- Standards and guidelines for protection of other resources, or mitigation of effects from timber harvest, could not be met as modeled for the Forest Plan.

The Shoshone Forest Plan was amended in August 1994 to reflect a recalculated ASQ. The revised ASQ, which took effect in FY 95, is 45 million board feet (MMBF) or an average annual of 4.5 MMBF.

#### Evaluation

The problems mentioned above were addressed in the ASQ reanalysis. In FY 95, the Forest sold 2.3 MMBF of volume chargeable towards the ASQ (Periodic Timber Sale Accomplishment Report). The Shoshone National Forest ASQ will be revisited as part of the Forest Plan revision beginning in 1997.

### 2. Restocking of Clearcuts

The National Forest Management Act (NFMA) requires that where trees are harvested for timber production "the cuttings shall be made in such a way as to assure that the technology and knowledge exists to adequately restock the lands within five years after final harvest". For clearcuts that means five years after the clearcut occurs (36 CFR 219.27 sec. (c)(3)). This monitoring item was intended to insure that clearcuts are restocked by the 5th year by requiring regeneration surveys 1, 3 and 5 years after the clearcut.

Since 1990 only 56 acres of the Shoshone National Forest have been treated by clearcut. These acres represent three timber sales on the Wind River district:

**Table 5: Acres Treated by Clearcuts in the Last Five Years**

| Sale Name | Final Harvest | Acres |
|---|---|---|
| Union Pass Blowdown Salvage | 06/01/92 | 22 |
| Trapper Creek | 06/01/92 | 12 |
| Wildcat Blowdown Salvage | 09/30/92 | 22 |

The Forest Plan requires that this item be monitored by regeneration survey. The Union Pass Blowdown, Trapper Creek and Wildcat Blowdown Sales are scheduled to be regeneration certified (5th year survey) in 1997.

**Evaluation**

Clearcut areas are monitored on the Shoshone the 1st and 3rd years after harvest although they are not always documented unless a problem is noted. The major effort goes into verifying that restocking will occur 5 years after harvest. As mentioned above, the 1992 clearcuts will be surveyed for regeneration in 1997.

In addition to regeneration surveys on recently harvested acres, the Forest has dedicated considerable time visiting, evaluating, certifying, and surveying acres treated by clearcut prior to the passage of the NFMA in 1976, in order to update records and evaluate past silvicultural treatments on the Forest. Regeneration limitations are often due to site preparation or slash disposal methods applied prior to passage of the NFMA. The vast majority of acres of clearcut on the Shoshone were treated prior to 1976. Although the NFMA only required surveys on those lands harvested after enactment of the act, the Forest has chosen to expend effort on evaluating previously harvested acres. In FY 94 over 1,000 acres of prior treatments were evaluated and certified. In FY 95 that number was 1500 acres of prior year treatments on the south end of the Forest.

**3. Timber Stand Improvements**

Timber stand improvement (TSI) refers to vegetation management activities that improve the composition, condition or growth of a stand of trees. This monitoring item requires that acres of timber stand improvement not vary more than 25% from what is planned annually. The Forest Plan projected 121 acres per year of Timber Stand Improvement for the time period between 1991 and 2000 (Land and Resource Management Plan, Table III-1, page III-14). Between 1991 and 1995 the Forest treated a total of 837 acres or an annual average of 167 acres. The following is a list of the acres of TSI projected by the Forest Plan and accomplished for the last five years:

**Table 6: Timber Stand Improvement 1991-1995**

| Year | Forest Plan | Acres Treated | % of Forest Plan |
|---|---|---|---|
| 1991 | 121 | 40 | 67 |
| 1992 | 121 | 407 | 336 |
| 1993 | 121 | 0 | 0 |
| 1994 | 121 | 140 | 115 |
| 1995 | 121 | 250 | 206 |
| 5-Yr Avg | 121 | 167 | 138 |

**Evaluation**

Emphasis for TSI activities has been placed in past cutover areas on the Forest to enhance new stand growth by reducing competition on desirable species and to promote individual tree growth. The majority of this work has been achieved through the use of TSI contracts which are inspected by Forest personnel. Payment to contractors is approved after they meet the minimum requirements of the contract and the inspectors approve the units. Force account crews and seasonal work crews have also completed TSI treatment under the guidance of a forester within this time frame. Accomplishments for the period shown above have been monitored on-the-ground by contract inspectors and foresters, through the use of daily diaries and inspection reports.

Between 1991 and 1995 the Forest accomplished approximately 138% of what the Forest Plan projected for acres of TSI. In FY 94, 115% of the projected acres of TSI were completed and in FY 95, 206% was accomplished. The Forest exceeded the 25% allowable variability in both years. It should be noted that some of these contracts are multi-year contracts and therefore acreage accomplishments will vary from year to year. In some years accomplishments may exceed the planned acreage target while in others they are under estimates.

**4. Growth Response**

Growth response is monitored by Forest personnel through stand exam surveys. Growth response of timber stands to vegetative treatment was reviewed on the Shoshone as part of the 1994 Allowable Sale Quality amendment to the Forest Plan. Following the release of the 1986 Forest Plan, foresters noted that the predicted yields, on the average, were not being realized for a number of reasons (see discussion under Allowable Sale Quantity heading). The ASQ amendment addressed that issue and modifications were made to correct the growth and yield table coefficients.

**Evaluation**

In predicting timber yields for the Shoshone National Forest, the Forest Plan assumed a level of treatment that would stimulate growth, particularly commercial thinning, that is not being realized. For example, some Forest Plan prescriptions modeled 2 or 3 thinnings prior to final harvest to stimulate growth. On-the-ground monitoring indicates we don't get the growth response projected in the Forest Plan and timber stands are, for the most part, thinned once prior to harvest.

**5. Size of Clearcuts**

Clearcuts greater than 40 acres in size require the Regional Forester's approval. Clearcuts on the Shoshone National Forest have not exceeded the 40 acre maximum. (See discussion under Restocking of Clearcuts heading)

**6. Openings Created by Management Activities**

This monitoring item was intended to assure that openings created by management activities not exceed the size of adjacent natural openings 20 acres or more in size. This says, in effect, that management activities should not result in an opening greater than 40 acres.

Vegetation management activities which will result in openings in forested areas are monitored through the interdisciplinary team process before activities occur. Areas selected for treatment are reviewed in an interdisciplinary forum to make sure openings created by management activities are compatible with the needs of key wildlife species identified in the Forest Plan.

**Evaluation**

Openings created by management activities have not exceeded the specified limits. The Shoshone will continue to monitor openings in forested areas created by management activities to assure that desired future conditions are met and that standards and guidelines are being followed.

**7. Lands not Suited for Timber Production**

The Forest Plan is one of the tools used to monitor management activities on lands not suited for timber production. The standards and guidelines in the Plan specify what types of activities are permissible outside the suited timber base and are reviewed before activity occurs. This monitoring item was intended to guarantee that lands outside the suited timber base not be used for wood fiber production unless it is a byproduct of other resource management objectives such as creating openings for wildlife.

**Evaluation**

Two timber sales, the Switchback Sale and the Poleback Sale are planned in Sinks Canyon on the Washakie District outside of the suited timber base. These are small sales designed to open up a migration corridor for bighorn sheep in the area. The Poleback Sale sold in FY 95 and will be done in FY 96. The Switchback Sale was advertised in FY 95 but did not sell. It will be re-advertised.

An estimated 1.0 MMBF of products other than sawlogs are sold as fuelwood each year from non-suited timber lands.

## WATER RESOURCES

### 1. Water Quality Trend; Effects of Specific Resource Management Practices on Water Yield/Quality; Verification of Models/Coefficients Used to Predict Effects in the Plan and to Set Threshold Levels

Water resource monitoring on the Shoshone National Forest is occurring in a number of arenas. The following are some of the major monitoring efforts:

**Silvertip Watershed Monitoring Project** - In 1988 the Clover-Mist fire burned approximately 120,000 acres of the Shoshone National Forest. Some of the most intensive burn on the Forest occurred in the Jones Creek drainage which is part of the upper North Fork Shoshone River drainage, Wapiti Ranger District. The drainage lies within the Absaroka Volcanics, a geologically active area for which little watershed information existed prior to this project. Crow Creek, an adjacent watershed similar to Jones Creek, did not burn. The paired drainages provided an opportunity for comparison. This project was initiated to assess the effects of a severe wildfire on watershed resources.

The Shoshone National Forest, the Rocky Mountain Forest and Range Experiment Station, the Wyoming Department of Environmental Quality and the U.S. Geological Survey collaborated on the project. Data on stream discharge, suspended sediment discharge and water quality was collected from both watersheds for water years 1989 through 1993.

**Evaluation**

The Silvertip Watershed Monitoring Project was completed in FY 95 and a final report was released. Because pre-fire data did not exist for the watersheds studied, the effects of the fires are inferred and not a statistical assessment. However analysis results suggest that the fire had effects on water quantity, timing, and quality, largely as a result of an increase in streamflow quantity and sediment export. Assuming Crow and Jones Creeks had similar flow regimes before the fire, Jones Creek's higher unit-area flow early in the annual runoff period is one effect of the fire.

Seasonal water yield (April-October) averaged 138 millimeters more for Jones Creek than for Crow Creek for data collected between 1989 and 1992. Adding 1993 data did not change the results. These findings are consistent with studies done in other areas in the Rocky Mountains (**Effect of Fire on Streamflow and Sediment Transport, Shoshone National Forest, Wyoming, C.A. Troendle and G.S. Bevenger, 1993**).

Again assuming that Jones and Crow Creeks were similar in terms of suspended sediment before the fire, sediment export from Jones Creek increased considerably during the years studied as a result of greater availability (i.e. riparian areas denuded by the fire) and flow.

Chemical water quality data was collected and statistical analyses conducted on a number of parameters. Analysis results indicate differences in chemical water quality between the two watersheds. Inferences can be made from analysis conducted thus far although the Forest Hydrologist feels additional analysis is desirable.

One of the most direct benefits of this project is five years of data collected for both the largely unburned Crow Creek and the severely burned Jones Creek relative to streamflow (quantity and timing), suspended sediment production and a number of chemical/physical parameters. Base data was gathered where none was available before. Although concrete conclusions cannot be drawn

from this project, inferences can be made about the effects of fire and other management activities (particularly those that remove a substantial portion of the vegetative cover) on a watershed.

The desire of those that collaborated on this project is that watershed recovery over time be monitored. Work done to date has shed considerable light on watershed response to fire as well as to other land disturbing activities. Continued monitoring of this project is dependent on availability of funds.

**Watershed Cumulative Effects Model** - The Watershed Cumulative Effects Model (WCEM) was developed by the Forest Hydrologist, in response to the need for a method to analyze watershed cumulative effects on the Shoshone National Forest. Though watershed models exist for predicting hydrologic and geomorphic thresholds, they are limited to predicting effects from timber harvest, roading and fire. At the time this model was developed, a need was recognized for predicting effects of other land disturbing activities such as mining, grazing and recreation.

Documentation on the details of the WCEM can be found in the Shoshone National Forest Final Oil and Gas Leasing Environmental Impact Statement, (December 1992) and the Shoshone National Forest Allowable Sale Quantity Final Environmental Impact Statement (August 1994). In a nutshell, data on surface disturbance activities - past and present - which potentially affect water quality was collected from District files and entered into a database. Activities were converted into equivalent disturbed area (EDA) using roads as an index. Equivalent disturbed area factors were indexed to roads. This is a means to account for differences in levels of impact between activities.

Inherent soil and water hazard was also taken into consideration. The hazard rating refers to the ability of the landtype to absorb surface disturbance without irreversible or irretrievable impacts. The percentage of a given watershed in high or moderate hazard was determined. Given this information, watersheds were run through a series of screens to determine which, if any, might be approaching a level of concern.

**Evaluation** - The result of the WCEM is a list of watersheds of concern (WOC). A WOC is one "where impacts have reached a level of disturbance at which watershed condition and stream health may be degraded beyond their ability to recover in the short term" (Shoshone National Forest Allowable Sale Quantity FEIS, Aug. 1994, p. III-55). Because evaluation of a watershed for proposed or future management activities relies on field data, there are three categories of WOC based on whether or not field verification has occurred.

Watersheds in the first category are validated watersheds of concern. Field data analysis and interpretation validates these watersheds have reached a level of disturbance where watershed condition and stream health is degraded to a point that recovery will not occur in the short term.

Watersheds in the second category, unvalidated, have not been field verified. Watersheds in the third category, additional, are those that did not screen out of the model as watersheds of concern, but appear to be approaching a level of concern.

Watersheds of concern are not off limits to future land management activities. Rather, extraordinary mitigation measures may be needed should future site specific management activities be proposed.

The following is a list of watersheds in each category grouped by major drainage or ecological unit:

**Validated Watersheds of Concern**

**Clarks Fork of the Yellowstone River**

C15 - Elk Creek drainage
C17 - Huff Gulch and Gravel Bar Creek areas
C20 - Little Sunlight and Little Sulphur Creek drainages
C21 - Painter Gulch Area
C24 - Cathedral and Reef Creek drainages
C25 - Lodgepole Creek area
C26 - One Hunt Creek, Hoodoo Creek, and Temple Creek area
C27 - Papoose Creek, Timber Creek, Closed Creek and Upper Crandall Creek areas
C29 - Onemile and Squaw Creek drainages
C30 - Pilot Creek and Jim Smith Creek area

**North Fork Shoshone River**

W10 - Upper North Fork Shoshone River area
W11 - Jones Creek drainage
W12 - Crow Creek drainage

**Unvalidated Watersheds of Concern**

**Clarks Fork of the Yellowstone River**

C07 - Lower Clarks Fork Canyon area
C16 - Beem Gulch area

**North Fork Shoshone River**

W23 - Twin Creeks drainage

**Additional Watersheds of Concern**

**Clarks Fork of the Yellowstone River**

C28 - North Fork Crandall Creek drainage
C32 - Dry Fork Creek drainage

**North Fork of the Shoshone River**

W06 - Sweetwater Creek drainage
W09 - Grinnell Creek drainage

**Wind River Area**

R16 - upper portion of the Long Creek drainage
R19E4 - Trout Creek drainage (a subwatershed of R19, Warm Springs Creek)

Most of these watersheds met the criteria largely due to wildfire and past logging related activities, particularly roading. A few met the criteria due to domestic grazing and facility development.

**Project Level Monitoring**

Forest watershed personnel routinely monitor timber sales. Timber sale contracts are examined for mitigation prescribed in environmental decision documents. Timber sales are also monitored to ensure that contract items are implemented.

Other land disturbing activities such as road construction and reconstruction are monitored as well. The paving of the Chief Joseph Highway on the Clarks Fork district was monitored to ensure that contract terms were being met. The development of the North Fork Highway EIS (reconstruction) has had considerable input from watershed staff. Monitoring items were recommended to address soil and water concerns.

Stream health and aquatic habitat information was collected during 1994 and 1995. Various parameters were measured depending on the year sampled, type of stream and management activities within the watershed. Generally, channel morphology measurements included valley bottom width, bankfull width/depth ratio, gradient, sinuosity, entrenchment, excessive fine sediment deposition and bank stability. Other aquatic habitat parameters included number and depth of pools, various measures of fish cover, stream bank alteration by grazing ungulates, livestock forage utilization along the stream banks and potential barriers to upstream fish migration (both human caused and natural). Impacted (study) streams are being compared to unimpacted or minimally impacted (reference) streams. This information is being used to determine existing condition.

**Evaluation**

In 1994 and 1995 habitat surveys were conducted on 42 and 38 stream reaches, respectively across the Forest. Preliminary findings indicate significant differences for certain parameters in the East Fork, Bear Creek and Wiggins Fork drainages. Currently, it is felt these differences are primarily caused by historical grazing, timber harvest and roading impacts and are in a recovery period. More detailed field observations and data analysis may be needed to validate these preliminary findings. The information collected during 1995 for stream health and fisheries habitat condition in other portions of the Forest is currently being analyzed.

The Forest Hydrologist developed a simplified field technique for measuring fine sediment deposition in streams (Bevenger and King, 1995). This methodology is used by the watershed and range crews in their monitoring efforts on the Forest. It is also being adopted as guidance in Region 2 of the Forest Service. Other National Forests and Federal agencies are using or considering using this methodology as well.

In 1994, a graduate student from Colorado State University collected macroinvertebrate data along with stream health and fish habitat information in selected reaches of the Wiggins, Bear Creek and East Fork drainages on the Wind River District. From the various reaches in the three stream types sampled, she found that macroinvertebrate communities were significantly different in watersheds with land use activities than those from reference sites. Diversity of macroinvertebrates was lower

within areas of land management than at reference sites. Increases in the number of Chironomidae (a sediment tolerant insect) were similarly noted.

**2. Water Uses**

New water right applications are reviewed to ascertain the requested use will not conflict with existing uses and rights, including instream flow needs quantified by the Big Horn adjudication. Potential conflicts are resolved either as the application is processed through the State Engineer's Office or through Special Use Permit clauses once a right is granted.

The Forest water use inventory electronic database no longer exists as it was inadvertently deleted from the agency computer in Fort Collins, Colorado. Efforts are being pursued by the Regional Office to reconstruct the database. In the interim, a hard copy database is utilized.

**Evaluation**

The Forest made application on June 2, 1994 to the State Engineer's Office for an instream flow for the Clarks Fork Wild and Scenic River, per direction in Public Law 101-628. The application is presently being processed by the State Engineer.

## MINERALS

### Compliance with Terms of Operating Plans and Consistency with Plan

#### 1. Locatable Minerals

Operating plans for minerals are the mechanism used to authorize mining ventures. Mining claims are recorded with the Bureau of Land Management (BLM). Claimants initiate actions with the surface management agency when they file a Notice of Intent. If there is a likelihood of disturbance or potential for impact to resources, an operating plan which details the specifics of the operation may be requested from the claimant. If a determination is made that an activity proposed on forest land is not significant the Forest can approve the operation immediately.

Inspection of operations for compliance are conducted by a Forest officer. Currently there are no active operating plans for mineral exploration or development. In FY 94, no operating plans were submitted.

In FY 95 the Forest received one operating plan from Clovis Minerals for mineral exploration on Round Top Mountain, Washakie Ranger District. After submittal, Clovis Minerals modified the original proposal to minor surface prospecting and sampling of existing adits and prospecting pits. The modified proposal posed no ground-disturbance or impact on resources.

**Evaluation**

All operating plans are evaluated against the Forest Plan Standards and Guidelines. The Shoshone National Forest will continue to inspect mineral operations for compliance with operating plans when exploration or development is active.

#### 2. Leasable Minerals

Operating Plans for leasable minerals (primarily oil and gas) are processed and implemented in a different manner than those for locatable minerals. A company wishing to propose ground disturbing activities for leasable minerals must first have possession of a valid lease for the land on which the activity is proposed. Under the Forest Plan and BLM regulations, several, staged processes are used to authorize, implement and monitor ground-disturbing activities. These are: identification of National Forest System lands that are available for leasing (USFS to BLM); advertising (BLM) and issuing leases (BLM with USFS concurrence); receiving (BLM), analyzing (USFS) and approving (BLM) proposals for surface operating plans for exploration; monitoring of approved surface operations (USFS); receiving (BLM), analyzing and approving (BLM and USFS) proposals for well or field development; monitoring surface activities at production sites (USFS); and abandonment and restoration of wells or fields (BLM and USFS).

In 1987, Congress passed new laws regulating onshore oil and gas leasing. Both the USFS and BLM then promulgated new regulations governing oil and gas leasing. As a result of the new laws and regulations, the Shoshone prepared an Environmental Impact Statement to amend the 1986 Forest Plan to include the provisions of the 1987 law. The EIS was completed in 1992 and a Record of Decision was written in mid-1993, amending the Forest Plan. However, release of the ROD was postponed until February of 1996 while it was being reviewed by the USDA. Between April of 1990 and the present, no leasing of additional parcels has taken place on the forest.

Since 1986, there have been four requests for approval of surface operating plans for exploratory drilling on the Shoshone National Forest. Two were in 1986-87 and resulted in approved plans and the drilling of

unsuccessful wells. Both operations were closely monitored by U.S.Forest Service personnel. A proposal to drill on Carter Mountain was dropped in 1991 when the Forest declined to allow exemptions to Forest Plan Standards and Guidelines. A proposal to drill in the Lava Mountain areas was analyzed and approved in 1992, but was not implemented by the proponent. It was re-proposed in FY 95 and will be implemented in 1996.

**Evaluation**

Leaseable mineral activity has been very low on the forest. When it has occurred, it has received thorough analysis and monitoring. Surface Operating Plans have been prepared which are in full compliance with the standards and guidelines of the Forest Plan and there have been no major exceptions granted to lease or operating plan stipulations. The Oil and Gas Leasing EIS and Record of Decision processes used data from past oil and gas activity monitoring, wildlife/endangered species monitoring and watershed accumulative effects monitoring to determine new standards, guidelines and stipulations which will be applied to future leasing and surface operations. The "no net increase in roads" policy was originally developed in the leasing EIS and amended into the Forest Plan with the ASQ amendment.

**3. Common Variety**

In 1995, only one commercial use permit was authorized for the gathering of boulders on the Forest. This permit authorized the removal of 10 tons of rock, or about ten boulders. A number of personal use permits were authorized for the gathering of decorative stone.

**Evaluation**

As the cost of building materials and rock increases it is expected that there will be a growing demand for the use of the Forest as a source of rock or gravel material.

## LANDS

### 1. Land Exchange Offers

The Shoshone National Forest does not have a large land exchange program. No exchanges were projected in the Forest Plan for the period of time between 1991 and 2000 (although the allowable variability from projected land exchanges is 50%). This can be attributed to the favorable land ownership pattern of the forest which generally offers few opportunities for land exchanges. However, several opportunities have come up over the past several years to either acquire needed property at little cost to the Forest or solve a management concern. When it is determined to be in the public interest, the Shoshone National Forest works to capitalize on these opportunities.

In January, 1995 the Lander Administrative Exchange was finalized. Through this exchange the Shoshone National Forest acquired a 2.32 acre parcel of land for the site of the Washakie Ranger District Office. Federal properties offered in this exchange included four excess administrative parcels located on the Shoshone and Medicine Bow National Forests.

The South Fork Exchange on the Wapiti District was first proposed in 1988 as a method to consolidate landownership, resolve trespass situations, and acquire range for the bighorn sheep population in the area. The project was undertaken in conjunction with the Nature Conservancy as a pooled land exchange with the participation of seven landowners. Since its inception, several of the landowners have dropped out of the exchange because they felt their monetary or land configuration objectives could not be met. Other problems encountered included disagreement over appraised land values and disagreement with appraisal methods. Three landowners remain involved in the exchange which consists of seven federal parcels (171.26 acres) and five non-federal parcels (155.37 acres). The project is currently proceeding with Regional Office (Rocky Mountain Region of the Forest Service; Denver, Colorado) review and completion of the Exchange Agreement.

Efforts have been underway since 1990 on the Shoshone National Forest to acquire conservation easements on high priority lands in the Sunlight Basin/Crandall area of the Clarks Fork District. Lands of particular interest are those lying within and adjacent to the Clarks Fork River which was designated as Wild & Scenic in 1990. The proposed New World Mine, located in Montana just north of the Clarks Fork Ranger District poses a threat to the character of the Clarks Fork River Drainage in the Sunlight/Crandall area. There is a concern that the influx of population associated with the proposed mine will result in the development of parcels of private land in this area.

#### Evaluation

Conservation easement acquisition efforts have included the identification of high priority parcels of land in the Sunlight/Crandall area, and discussions with the landowners of these parcels. In 1995 appraisals were conducted on three of these parcels. In both 1994 and 1995, the Forest requested funds through the Land and Water Conservation Fund program for these acquisitions. Unfortunately the demand far exceeds available money and these proposals have not received funding. Because funds have not been available to acquire these easements, the Forest is currently pursuing a possible land exchange as an alternative method to acquire easements in this area.

### 2. Right-of-Way Acquisition

The Shoshone National Forest Plan projected an average of 2 right-of-way acquisitions per year with an allowed variability of plus or minus 50%. In both FY 94 and FY 95 the Forest met 50% of its target or 1 ROW.

In FY 94 the ROW was on the Game & Fish section of Forest Development Road #411 (Trail Lake Road) on the Wind River Ranger District. In FY 95 the ROW was on a road re-route for Forest Development Road #204 (Timber Creek Road) on the Greybull Ranger District. This right-of-way was acquired by donation.

Due to the increase in recreation use of the forest, there is a continued need for right-of-way acquisition to access lands without current legal access. Lands without legal access have been subject to closure by landowners who have previously allowed free passage of recreationists without legal access. Problems identified by these landowners include off-road vehicle usage, inadequate roads and garbage accumulation on private lands.

**Evaluation**

Acquisition of rights-of-way has become increasingly difficult as more and more landowners are reluctant or unwilling to convey easements. The continued shortage of road construction and maintenance funds often preclude measures which could be undertaken to alleviate private landowner concerns. The shortage of these funds has made it difficult for the forest to meet its obligations on existing agreements, which makes negotiations with landowners for additional easements extremely difficult if not impossible.

For the past several years the forest has cooperated with other agencies, including the Bureau of Land Management (BLM), and Park and Fremont Counties, to work towards acquisition of high priority rights-of-way and find solutions for access problems. The Shoshone National Forest cooperated with the BLM on the Owl Creek Road (Greybull Ranger District) by completing needed survey work. However, right-of-way acquisitions in this area have not been finalized due to difficult landowner negotiations.

When landowners threatened to close the Monument Hill Road on Rattlesnake Mountain (Wapiti Ranger District) during hunting season, the Forest worked with Park County to negotiate a monitoring schedule to prevent degradation of private lands. Given present budgets, these sorts of solutions will become more and more critical to continued access to the forest.

**3. Land-line Location (Property Boundary Location) and Occupancy Trespass**

Property Boundary Location on the Shoshone National Forest is conducted as needed for project support and in response to occupancy trespass only. Because of this policy, the Forest did not have a Property Boundary Location target in FY 94. In FY 95 the Forest took on a target of 2 miles. The Forest Plan did not project any landline location for the period of time between 1991 and 2000 although it specified a 25% allowable variability from projected outputs. In 1994 and 1995, 2 miles of high priority boundary was marked on the Wind River Ranger District. This work resulted in the discovery of several instances of Occupancy Trespass. Resolution of these trespass situations is currently being pursued through a Small Tract Act Sale in one case, and removal in the other cases. Continued attention is planned in this area to prevent future trespass problems.

**Evaluation**

A need for increased emphasis on boundary location on the forest was identified as development in areas adjacent to the Forest increases. The greatest need is on the Wind River District in areas immediately outside of the town of Dubois where building is occurring adjacent to the Forest boundary. Another area of concern is the Sunlight/Crandall area where an increased level of development is making property boundary management an issue. Locating boundaries before development occurs in these areas will prevent costly adjustments later.

**4. Compliance with Terms of Land Use Authorizations (Special Uses) and Consistency with the Plan**

Demand for special uses on the forest continues to increase. The Shoshone National Forest has taken several steps to deal with the increasing special uses workload. As part of the Forest's reorganization, a change was made in the way the workload was accomplished in 1994.

Operating plans were written for lodge permits, and a self-inspection monitoring program for recreation residences was begun. On the Washakie District, a prospectus was written in 1995 to find a new operator for the Louis Lake Lodge Resort and associated outfitting activities.

At the end of FY 95, the Forest had the following numbers of permits in place:

South Zone 193 Total permits
- 3 Lodge Permits
- 2 Organizational camp permits
- 29 Recreation Residence permits
- 73 Outfitter/Guide
- 12 Agricultural permits
- 9 Road Easements or permits
- 24 Communications permits
- 16 Water conveyance easements/permits
- 25 Miscellaneous permits

North Zone 267 Total permits
- 1 Organizational Camp permit
- 4 Ski area/activity permits
- 14 Lodge Permits
- 71 Recreation Residence Permits
- 45 Outfitter/Guide
- 8 Agricultural permits
- 25 Road easements/permits
- 14 Communications permits
- 63 Water conveyance easements/permits
- 22 Miscellaneous permits

**Evaluation**

The purpose of this monitoring item is to ensure that parties holding permits on the national forest comply with the terms of the permits and that noncompliance be monitored and corrected. Special Use Permit administrators monitor compliance with permit terms and conditions. Where non-compliance with permit terms are noted, operating plans attached to the permit include a schedule of timeframes for correction of these deficiencies. Emphasis has been on those permits with the greatest potential for health and safety concerns, such as lodge resort and ski area permits.

Because of low funding levels and the size of the workload the Shoshone had a backlog of expired permits as well as new permit applications that had not yet been processed.

As a result of the Forest's reorganization a self-managed team was established to handle the special uses workload. This accomplished several things. One was increased knowledge of special uses as team members pooled their expertise to accomplish the work. This then resulted in increased efficiency, which allowed the team to both process more permits and accomplish a great deal more

on-the-ground monitoring. The work accomplished in FY 95 is evidence of that. The backlog of expired permits was cleaned up and relationships with the public were built.

## SOILS

### 1. Soil Erosion

The Shoshone National Forest Plan directed the use of the Modified Soil Loss Equation (MSLE) to monitor soil erosion occurring on the Forest. However, tolerance levels are dependent on Soil Resource Inventory (SRI) interpretations. The SRI is currently underway on the Shoshone and will be completed in FY 97. Therefore the MSLE is not currently being used.

Soil erosion is modeled along with other effects of land disturbing activities through the Watershed Cumulative Effects Model (WCEM) developed on the Forest (see Watershed Cumulative Effects discussion under Water Resources heading).

#### Evaluation

For the last eight years the Forest Service in cooperation with other agencies has been working on a new methodology for measuring erosion. In July of 1995 the USDA Water Erosion Prediction Project (WEPP) was completed (NSERL Report No. 11, July 1995). WEPP will be used by the Shoshone to model and predict erosion. It will be implemented beginning in 1996 as projects occur and is expected to be incorporated into the revised Forest Plan. Main implementation will occur with the revised Forest Plan. WEPP will effectively replace the MSLE.

### 2. Soil and Water Resource Improvement (Improved Watershed Conditions)

The Shoshone National Forest has an active watershed improvement program. The program emphasizes road obliteration and road drainage. Many roads on the Forest are not properly constructed or maintained, thus are a major source of sedimentation and water quality degradation. All roads in selected watersheds (see Watershed Cumulative Effects Model Evaluation under Water Resources heading for discussion on watersheds of concern) are inventoried by a seasonal watershed crew who gather data on location and condition of the roads, whether roads are closed, use levels, existence and condition of drainage structures, and other problems which may cause erosion and sedimentation. Information has also been collected on potential upstream fish migration barriers caused by improper road culvert placement. Information gathered is then used to determine which roads need obliteration, better drainage or culvert replacement.

#### Evaluation

The Forest exceeded its watershed improvement target in fiscal years 1994 and 1995. In 1994, the target was 4 acres; fifty two acres were accomplished by the end of the fiscal year. In 1995, the target was 43 acres; 59 acres were accomplished.

Much of the work involved obliterating roads, many of which are old logging roads. Some were not effectively closed and were still being used by the public. Others were effectively closed, meaning they were not being used, but lacked adequate and functioning drainage structures resulting in erosion and potential sedimentation of streams. The rest of the work involved adding drainage structures, such as culverts and water bars, to system roads to reduce erosion. In 1995, 47 culverts were added to the Wiggins Fork road to divert road drainage, usually containing sediment, across the road into a vegetated strip, which filters out sediment before it reaches a waterway.

Three potential barriers to upstream fish migration, resulting from improper culvert placement, were found on the Wind River District. Future detailed evaluation is needed to determine the severity and measures that need to be taken to alleviate the problem.

Watershed improvement efforts in the last few years have been focused on the Wind River District. The District's active timber program in past decades left a network of logging roads throughout the area. Forest personnel conducting inventories found three times more roads than previously estimated. Monitoring has shown that merely legally closing the roads is often not enough to prevent soil and water resource damage. Monitoring also indicates that some previous road obliteration and closure efforts were ineffective and need more work.

Road inventory on the Wind River District was almost completed in FY 95. The inventory will be completed on the Wind River District and started on the Washakie District in FY 96. Some road inventory has occurred on other Districts in the last 2 years. Watershed improvement efforts will continue on the Wind River District in 1996.

Changes in funding authorities in 1993 allow the Forest to use road maintenance funds to partially fund road obliteration and road-side erosion control/sedimentation projects. As a result of these funding changes and watershed cumulative effects monitoring, portions of the road maintenance budget have been directed at correction of watershed and soils related problems associated with roads. See the Facilities section for additional details.

**3. Soil Survey**

The Forest Plan requires the Forest to meet its annual acreage target for soil survey plus or minus 25%. The annual target was 300,000 acres in FY 94 and 600,000 acres in FY 95. Targets were met both years.

**Evaluation**

The field work portion of the Shoshone's soil survey will be completed in FY 96. Report writing will occur in 1997.

## FACILITIES

Forest Plan Monitoring Requirements for facilities were modified in the Allowable Sale Quantity amendment in 1994 (Allowable Sale Quantity Record of Decision, August 1994). Most of the changes made pertain to roads although one item is related to trails. The portions of the amendment dealing with roads were a direct result of analysis of the effectiveness of the roads monitoring requirements and road issues raised by the public in several environmental analysis documents between 1986 and 1993. These included the Brooks Lake Leasing EA, Oil and Gas Leasing EIS, ASQ EIS, and several timber sale EAs. The following discussion incorporates the new monitoring requirements.

### 1. Road Construction/Reconstruction (Local, Arterial and Collector).

For this report, and in concurrence with definitions in Amendment No. 94-001 to the Shoshone National Forest Plan, "new road construction" is defined in the Forest Plan as any road construction activities which increase the total number of road miles in the Forest Development Transportation System. Road reconstruction is defined as realignment, betterment or restoration of an existing Forest Development Road which does not change the total number of miles on the Forest Development Transportation System. Construction or reconstruction activities are those activities which are a result of the use of appropriated funds, timber purchaser credit funds and road construction or reconstruction by other parties operating under permit with the Forest. Road mileage added to the Forest Development Transportation System as a result of newer inventory data or Watershed monitoring efforts are not considered new construction miles. Road miles constructed and reconstructed have been tracked on the Forest by virtue of required year-end reports to Congress. There is every indication that this reporting will continue to be required because of a strong national interest in National Forest roads.

The road construction/reconstruction monitoring item in the Forest Plan initially included only arterial and collector roads. However, projections in the Forest Plan (see Table III-1, page III-15) refer to collector and local roads making it difficult to compare projections with actual accomplishments. The majority of roads constructed or reconstructed since the Plan was released have been local roads. This was one of the reasons the Forest Plan monitoring requirements were amended in 1994 to include local roads.

This monitoring requirement allows a 25% deviation from the planned accomplishment for road construction and reconstruction. The following are Forest Plan projections for collector and local road construction/ reconstruction:

**Table 7: Projected Average Annual Road Construction/Reconstruction 1991-2000**

| Miles | Collector | Local |
|---|---|---|
| Road Construction | 2.0 | 5.6 |
| Road Reconstruction | 1.7 | 1.9 |

Between 1991 and 1995 actual road construction averaged 2.6 miles per year. All of these were local road miles. This amounts to 54% less than the projected average annual figure of 7.6 miles per year and is outside the allowed range of variability. Actual road construction miles for local roads are shown below.

**Table 8: Actual Road Construction (Miles)**

| Year | Local Roads |
|---|---|
| 1991 | 6.0 |
| 1992 | 1.0 |
| 1993 | 4.0 |
| 1994 | 2.0 |
| 1995 | 0 |
| Average | 2.6 |

During the same five year period reconstruction of local roads averaged 1.8 miles per year or 5% less than the projected average annual figure of 1.9 miles per year. Collector road reconstruction averaged 1.4 miles per year or 18% less than the 1.7 miles projected. Average annual road reconstruction for the five year period between 1991 and 1995 is within the allowed variability established in the Forest Plan. The following table displays actual miles of road reconstruction per year by type of road.

**Table 9: Actual Road Reconstruction (Miles)**

| Year | Local Roads | Collector Roads |
|---|---|---|
| 1991 | 4.9 | 0 |
| 1992 | 0 | 3.5 |
| 1993 | 3.8 | 0 |
| 1994 | 0.5 | 3.5 |
| 1995 | 0 | 0 |
| Average | 1.8 | 1.4 |

In 1993, the forest switched to a new inventory system (R2TF) for roads which allows existing roads to be classified in a manner which more accurately reflects their use, condition, and classification. The Forest is still in the process of reclassifying the roads and entering them into the new system. Data gathered as part of implementation of a GIS system, revision of Forest-wide mapping (cartographic features files), the Oil and Gas Leasing Amendment, the ASQ amendment, watershed inventories and the Grizzly Bear Cumulative Effects Model is being used to update the inventory. In FY 96 the Forest identified a specific project which will begin to consolidate all the existing road-related data into a single road database. In late FY 96 or in FY 97, the R2TF database will be consolidated with a nation-wide facilities data base (INFRA-STRUCTURE) which promises to allow even increased flexibility for more closely classifying and tracking road data.

Total mileage of roads on the Forest Development Transportation System varies from year to year as knowledge of what exists on the ground increases. In 1994 and 1995, the Watershed monitoring program identified and inventoried many old, closed roads which were not included in the Transportation Inventory. These roads will be added to the inventory and there will be a corresponding increase in total inventoried miles.

**Evaluation**

The present reporting system for new road construction and road reconstruction is adequate to meet the monitoring requirements in the Forest Plan.

Construction and reconstruction of roads varies considerably from year to year. Because of high outputs in some years and almost no outputs in others it is more practical to compare trends over a period of several years with Forest Plan projections than to compare annual outputs. Though this item is monitored annually, comparing it to Forest Plan projections is difficult given changes that have occurred. For example, up until this monitoring item was amended in August of 1994, local road construction and reconstruction was not included. Yet the majority of roads constructed and reconstructed were in fact local. No arterial roads were constructed and only 1 mile was reconstructed during the last five years.

A policy of "no net increase in roads" was adopted in the 1994 ASQ amendment. The goal of this new policy is to limit or reduce the cumulative disturbance (to both wildlife and watersheds) caused by roads. This policy reinforces direction in the Forest Plan which states that "most local roads constructed for timber harvest will be closed to public use" except for reasons that include public safety. Cumulative effects analysis conducted in support of the Oil and Gas EIS (December 1992) and the Allowable Sale Quantity Amendment led to the determination that additional guidance was necessary to mitigate cumulative effects, hence the "no net increase" policy. Many of the miles of road construction and reconstruction shown in the tables above have been closed or obliterated. See the following sections on Roads Closed and Roads Obliterated.

Deviations from Forest Plan projections have occurred for other reasons as well. On the Shoshone National Forest virtually all road construction and much of the reconstruction is tied to timber sales. For example in 1987 all eleven miles of road were constructed for two timber sales - Squaw Creek and Wolf Creek. Between 1989 and 1992 harvest activities increased in an effort to salvage timber burned during the Yellowstone fires of 1988. In 1990 roads were constructed to access five timber sales - Blowdown Salvage, Upper Clint Creek, Camp Creek, One Mile East and One Mile West - resulting in higher outputs than projected. Once the bulk of salvageable timber was removed, harvest levels decreased. Consequently road construction and reconstruction in the five year period between 1991-1995 occurred at lower levels than in the first four year period following release of the Plan.

Although road construction was 54% below that anticipated in the Forest Plan and did not meet the stated 25% variance, the reduced level of road construction can be viewed as having an overall positive effect on adjacent resources. Roads are a primary factor in determining cumulative effects on watersheds, wildlife and Threatened and Endangered species (See Threatened and Endangered Species, Water Resources and Soils sections of this report). Roading represents major land disturbance; land disturbance is a key factor in cumulative effects. Minimizing levels of roading (even below Forest Plan tolerances) can have significant positive effects on other critical resources.

On the other hand, minimal roading and road reconstruction can have a negative effect on National Forest uses and resources that depend on adequate transportation systems, such as developed recreation and commercial users. Because most of the Forest's transportation system already exists, there appears to be minimal demand for additional recreational access. However, needs for local commercial access will continue to exist. The "no net increase in roads" policy will compensate for cumulative effects of future new roading.

Most of the Forest's arterial and collector roads have been in place for many years. Monitoring has shown that their condition is deteriorating or that some of the older roads were originally located where they would not be in compliance with the 1986 Forest Plan Standards and Guidelines. There is an increasing need to reconstruct many of these roads, particularly to resolve soil and water resource conflicts that are a result of original road location and to provide roads which meet the needs of increasing recreation use. The Shoshone's ability to obtain funding for these needs is limited by the decrease in national road funding levels.

Funding levels have had a major impact on the Forest's ability to implement Forest Plan programs including timber and road building. The Shoshone timber budget dropped substantially in 1993 from what it had been in the previous two years. It remained low through 1994 and 1995. This has had a direct affect on road construction and reconstruction on the Forest. Funding for non-timber road construction and reconstruction has been very limited since 1987.

Road maintenance funding can be used for minor road restoration (bringing a road back to its originally constructed condition), but not road reconstruction (improving upon the originally constructed road condition). The Forest is making maximum use of its limited road maintenance funds by splitting road maintenance funds among maintenance of high-use roads, inspection and maintenance of bridges (safety considerations), repair of water quality-related deficiencies, and obliteration of old roads which are identified as contributing to negative watershed cumulative effects.

The results of the watershed cumulative effects monitoring were a key factor in FY 94 and FY 95 decisions to shift portions of our road maintenance funds from traditional surface maintenance to erosion control and road obliteration. Continued watershed monitoring, acquisition of digitized cartographic features files, and data collection for the forestwide GIS system will increase our ability to monitor road-related impacts.

By using consolidated databases, new data from monitoring programs and the new R2TF road database, we will be able to more closely track individual roads from the time they are constructed to the time that they are fully obliterated, to the time that they are no longer considered a disturbance from a wildlife perspective.

**2. Roads Closed (System Road Miles Closed by Project Activities)**

This item was added to the monitoring requirements in the Forest Plan amendment to monitor the "no net increase in roads" policy (Allowable Sale Quantity, Record of Decision, August 1994). The Forest Plan contains direction that "all newly constructed roads be closed to public motorized use "subject to a number of considerations including public safety and public need" (Shoshone National Forest Land and Resource Management Plan, page III-8). The amendment also added specific direction for road closures (amended page III-88). This direction has been implemented on the Forest. Roads that were constructed for short term uses, such as timber sales, were subsequently closed or obliterated.

A "Closed Road" refers to one that still exists on the ground, but all forms of motorized travel on the road are prohibited, including administrative travel. Only emergency travel is authorized. Roads which are closed, as compared to obliterated, are still roads but are allowed to grow-over. They remain in place because analysis has shown a need for the road for future management activities. The number of road miles closed is monitored using the environmental analysis documents in which the decision to close individual roads was recorded and by monitoring the final implementation. From 1986 to 1995, this has primarily been roads associated with timber sales.

No roads were closed in FY 94 or FY 95, but all existing road closures were kept in place. See table 11 below for more information.

**3. Roads Obliterated (System Road Miles Obliterated by Project Activities)**

A road is obliterated when its functionality is eliminated by reclamation/restoration and it is returned to resource production. An obliterated road ceases to exist and is removed from the Forest Development Transportation System Inventory.

This item was added to the monitoring requirements in 1994 to monitor the "no net increase in roads" policy and goes hand-in-hand with the previous item. The amendment also added specific guidelines and criteria for road obliteration. Miles of newly constructed Forest Development road are measured against road miles obliterated so that for each five year period, beginning October 1, 1994, the number of miles of new Forest Development road construction does not exceed the number of miles of road obliteration, forestwide. Miles of roads constructed, closed and obliterated are shown in the following table.

**Table 10: Roads Constructed, Closed and Obliterated**

| Activity | FY87-90 | FY91 | FY92 | FY93 | FY94 | FY95 | Average |
|---|---|---|---|---|---|---|---|
| Mi Const | 29.0 | 6.0 | 1.0 | 4.0 | 2.0 | 0.0 | 4.7 |
| Mi Closed | 25.8 | 3.7 | .9 | 2.5 | 0.0 | 0.0 | 3.7 |
| Mi Oblit | 7.2 | 5.3 | 12.3 | 1.5 | 10.0 | 19.2 | 6.2 |
| Annual Net | | 0.7 | -11.3 | 2.5 | -8.0 | -19.2 | |
| 5-Yr Net | | 22.5 | 0.2 | -0.3 | -10.3 | -35.3 | |

**Evaluation (Roads Closed and Roads Obliterated)**

Road miles closed or obliterated by road-related projects and timber sales have been tracked on the Forest by virtue of required year-end reports to Congress. Data on roads closed or obliterated by non-road projects was not collected or reported before the 1994 amendment to the Forest Plan. The amendment requires year-end reporting of roads which were both closed and obliterated, as separate items.

Prior to the 1994 amendment, there was not a clear definition of the difference between closed and obliterated roads. The terms were used interchangeably. The amendment defined the difference and set monitoring standards. Only road mileages which are obliterated will be used for comparison with newly constructed miles for the purposes of "no net increase" monitoring. Although closed roads reduce both watershed and wildlife disturbance, closure is not long term and will not be considered.

Prior to the 1994 amendment, there was not a clearly defined process to monitor the effectiveness of road closures. The addition of a monitoring item for Level 1 Road Maintenance addressed that deficiency. See Level 1 Road Maintenance, below.

As is the case with road construction and reconstruction, it is more useful to look at trends over several years than data for a single year (see table below). Although no roads were closed in FY 94 or FY 95, 29.2 miles were obliterated while only 2 miles were constructed during that two year

period. Since the Forest Plan was published an average of 4.7 miles per year have been constructed, 3.7 miles per year closed and 6.2 miles per year obliterated.

**4. Level 1 Road Maintenance (Miles of Level 1 Maintenance Accomplished)**

This monitoring item was amended into the Forest Plan in 1994 (effective on October 1, 1994). Level 1 roads, by definition, are closed roads. Level 1 maintenance work includes regular visual inspection of drainages and erosion control and correction of deficiencies. The 1994 amendment added a requirement that effectiveness of the closure also be inspected and deficiencies corrected.

The Forest Plan (Tabel III-1) set an average annual output for level 1 road maintenance at 332 miles for 1986-1990 and 302 miles for 1991-2000. For FY 95, data specific to level 1 maintenance accomplishment was not collected due to an oversight and a change in national reporting requirements that eliminated the need for information on specific levels of maintenance. When the amendment was written, national reports required reporting of level 1 maintenance accomplishments. In FY 94, 28 miles of level 1 road were fully maintained. However, in both 1994 and 1995, the watershed monitoring effort accomplished basic level 1 road maintenance activities on hundreds of miles of level 1 road (see Water Resources and Soils sections, above). The inventories were not intended as road maintenance, but the activities conducted met basic level 1 road maintenance standards.

**Evaluation**

Level 1 road maintenance is the least expensive level of maintenance, but is the most labor-intensive. Before deficiencies in erosion control and road closure effectiveness on level 1 roads were identified through monitoring efforts, level 1 maintenance was the last priority for use of road maintenance funds. Priority was given to arterial and collector roads and to correct safety deficiencies on bridges. Increased monitoring of watershed conditions and public concern about the ineffectiveness of road closures (on level 1 roads) has indicated a need to increase emphasis on level 1 road maintenance. The Forest should develop a minimum level 1 road maintenance program, based on overall road maintenance budgets. However, as overall budgets decrease, an increase in emphasis on level 1 maintenance may not immediately occur. The Forest road maintenance priority is that which deals with public health and safety.

Without a national requirement for reporting a level 1 road maintenance accomplishment, the Forest needs to develop its own system for tracking that accomplishment. This can easily be accomplished through the use of the new All Resources Reporting system.

The level 1 road maintenance monitoring and maintenance requirements in the 1994 Amendment will be adequate to monitor the effectiveness of road closures. Increased emphasis on level 1 maintenance will also contribute to the correction of deficiencies identified in the watershed accumulative effects monitoring.

**5. Trail Construction/Reconstruction**

The Forest Plan projections for trails (Table III-1, page III-12) were broken into two categories: Trail Construction and Trail Maintenance, Reconstruction and Operation. Both of these categories were to be measured in miles. However trail information is reported annually by the Forest as Trail Construction/ Reconstruction and Trails Maintained (also measured in miles) making it somewhat difficult to compare the monitoring item with the projected outputs in the Forest Plan. The following table reflects Forest Plan projections from Table III-1:

**Table 11: Trail Activities by Time Period**

| Miles | 1985-1990 | 1991-2000 |
|---|---|---|
| Trail Construction | 3.0 | 5.7 |
| Trail Maint/Reconst/Oper | 1300 | 1347 |

In 1994 no new miles of trail were constructed. Reconstruction and maintenance of 1.3 miles of existing trail were completed. In 1995 2.4 miles of the new Four-Bear Trail were constructed and 2.2 miles of trail reconstruction and maintenance of existing trails were completed.Miles of trails maintained are addressed in the Recreation section under Trail Condition.

**Evaluation**

The Shoshone National Forest experiences high costs for trail maintenance and contains a large number of trail miles (see discussion under Recreation heading on Trail Condition). High use trails on the Forest are usually the top priority for maintenance and reconstruction while minimal attention is given to resource and facility protection. Although dollars were available for trail construction in FY 94 and 95, the majority of the dollars went into reconstructing and maintaining existing trails that the Forest had not been able to maintain or that posed a threat to safety or resource protection. Unless funding for this type of activity increases the Forest is relatively tied into its present system of trails. Constructing many new trails with current funding levels would result in more unmaintained existing trails.

## PROTECTION

### 1. Fuel Treatment Target

The Shoshone's fuel treatment program is largely tied to timber. Residue left after a logging operation is complete can increase the risk of fire if not disposed of properly. The Forest met its fuel treatment target of 20 acres in 1994 and 18 acres in 1995.

#### Evaluation

The Forest will continue its present fuel treatment program. In addition there are opportunities for a more proactive program of treating natural fuels by building fuel breaks around housing or timber stands. The Forest currently has a backlog of areas needing natural fuel treatment particularly on the Wind River District. There are 80 acres of this type of fuel treatment planned for FY 96.

### 2. Fire Management Effectiveness Index

This monitoring item measures the relative effectiveness of fire protection by comparing funds spent on initial attack resources with the predicted cost of a Most Efficient Level (MEL) of fire protection capability. MEL is defined as that level of expenditure for initial attack resources that results in the least cost plus resource loss. This is determined by extensive modeling of historic fire occurrence and the effects different protection strategies and capabilities would have had on those fires. This complex modeling is accomplished through the National Fire Management Analysis System (NFMAS) and is repeated every five to ten years so as to incorporate the most recent fire history.

#### Evaluation

In FY 94 $98,000, was spent on fire protection and $80,000 was spent in FY 95 which in both cases amounts to 87% of the funding needed to maintain resources at the MEL. Given that wildfire occurrence is a random event influenced by weather, the effects of operating at less than the MEL, as well as the appropriateness of the MEL determined through the NFMAS process, can only be determined by long-term monitoring and periodic reanalysis.

### 3. Forest Insects and Diseases

Monitoring for insects and disease on the Shoshone National Forest is coordinated and conducted by the Rocky Mountain Region's Forest Health Management department located in Rapid City, South Dakota (Rapid City Service Center). On the northern end of the Forest, efforts have been focused on portions of the Clarks Fork and Wapiti Districts where the Clover Mist Fire of 1988 killed or weakened many trees that have since become susceptible to disease and insect infestations.

An aerial survey of pest conditions on portions of the Clarks Fork and Wapiti Ranger Districts was conducted on July 27-28, 1995. The two areas surveyed were: (1) the Sunlight Creek and the Clarks Fork of the Yellowstone River basins and tributaries (including the north side of Pat O'Hara Mountain) on the Clarks Fork District; and (2) the North Fork of the Shoshone River and it's tributaries, from Wapiti west to Pahaska on the Wapiti District.

Recent tree mortality, as of July 1995, was found to be heavy and widespread in area (1), the northern portion of the survey area, and moderate and scattered over area (2), the southern portion. Approximately 275,000 acres of Forest Service, other Federal, and private lands were surveyed. An estimated 4,542

Douglas-fir trees were killed recently on 1,723 acres. Of this total, 52 trees on 13 acres are located on private land and 4,490 trees on 1,713 acres are located on the Shoshone National Forest. The primary cause of this Douglas-fir mortality is the Douglas-fir beetle, *Dendroctonus pseudotsugae*, which has been at epidemic population levels since 1989. The concentration of killed Douglas-fir is highest along the east slope of the Clarks Fork Canyon and on the upper slopes above Sunlight Basin.

In order to compare Douglas-fir mortality from 1992 to 1995, survey results were retabulated for one area of the northern portion that has been flown every year. This area is approximately 45,000 acres extending from Hunter Peak south to the northern edge of Sunlight Basin, including both sides of the Clarks Fork Canyon. The table below shows a 53% decline in Douglas-fir mortality from 1994 to 1995 over this smaller survey area. A downward trend is revealed by this tabulation. It may be that stands are becoming depleted of suitable host trees in this 45,000 acre area or that the epidemic has begun to subside.

**Table 12: Douglas-Fir Mortality on Study Area, Clarks Fork District**

| Year Tree Attacked | Year Tree Fades | Number of Trees Killed | Acres Affected |
|---|---|---|---|
| 1991 | 1992 | 5,585 | 2,324 |
| 1992 | 1993 | 2,924 | 935 |
| 1993 | 1994 | 2,922 | 1,572 |
| 1994 | 1995 | 1,553 | 754 |

In this northern survey portion, an overall decline in Douglas-fir mortality is apparent when compared with aerial survey results from 1994. Considerable mortality, however, was noted, particularly on Hunter Peak, along the rim of the Clarks Fork Gorge, and south of Sunlight Basin. The Douglas-fir beetle epidemic continues.

An estimated 503 Engelmann spruce trees were killed on 335 acres, all Forest Service land. The cause was determined to be spruce beetle, *Dendroctonus rufipennis*, although verification by ground examination is needed. Some of this mortality, however, may be subalpine fir attributed to Armillaria root disease and/or the western balsam bark beetle or fir engraver. Most of this activity is located on Table Mountain and above Pahaska.

Several areas of dying limber pine were spotted around Dead Indian Hill and Pat O'Hara Mountain. The cause needs to be verified from the ground, but probably is a combination of winter damage, white pine blister rust (*Cronartium ribicola*), and mountain pine beetle (*Dendroctonus ponderosae*). An estimated 39 acres of limber pine mortality (30 acres on private land and 9 acres on state land) was mapped.

An area encompassing 378 acres was diagnosed as lodgepole pine infected with dwarf mistletoe (*Arceuthobium americanum*). The area is located in upper Dead Indian Creek, above Dead Indian Meadows. Since the only visual clue for dwarf mistletoe from the air is an abnormally thin-appearing stand, further ground verification is needed.

In addition to aerial surveys, a gypsy moth survey is conducted annually on Federal lands in South Dakota and Northern Wyoming. In FY 94 ten detection traps were placed and retrieved on the Shoshone - no gypsy moths were caught. Twenty-two delimitation traps were placed at the Newton Creek Campground on the Wapiti District where a gypsy moth was caught in 1993. No moths were retrieved in 1994.

In FY 95, 20 detection traps were placed and retrieved on the Shoshone. One gypsy moth was caught at Falls Campground on the Wind River District.

**Evaluation**

Aerial surveys were concluded on the Shoshone in 1995. Data collected is being used to develop an estimate of loss model for the Douglas-fir beetle that will help the Forest assess what a future outbreak might do. The computer model will allow the Forest to use stand exam data to predict where and how much loss (low, medium, high) can be expected based on the existing condition of the stand. Such a model already exists for the mountain pine beetle. The Shoshone is only one of a number of Forests where data was gathered for the model.

More intensive trapping of gypsy moths is being planned for 1996 in areas where they were previously caught in order to determine whether populations became established and to assess the need for eradication efforts.

## AIR RESOURCE

### Effects of Other Resource Management on Air Quality and Air Related Values

Air Quality on the Shoshone National Forest is monitored on the south end of the Forest for two wilderness areas located in the Wind River Mountains, the Fitzpatrick and Popo Agie. The Shoshone and Bridger-Teton Forests have developed a long-term monitoring program in the Wind River mountains because of the extreme sensitivity of a large percentage of the lakes and many air pollution sources from the southwestern part of Wyoming such as existing and developing natural gas fields, coal-fired power plants, phosphate fertilizer plants, and trona mines. In addition, the Fitzpatrick on the Shoshone, and the Bridger Wilderness on the Bridger-Teton are Class I wildernesses. Under the Clean Air Act the Forest Service was given the "affirmative responsibility" to protect the resources it manages from unacceptable air pollution effects. An AQRV is any wilderness component that can be modified by man-caused air pollution such as flora, fauna, soils, water, visibility, odor, cultural or geologic features. The Popo Agie is a Class II wilderness but lies in the same granitic mountain range characterized by a low acid buffering capacity. The Wilderness Act of 1964 provides for protection of all wilderness values in all wilderness areas.

The Bridger-Teton Forest has been the lead in developing the AQRV monitoring program and the Shoshone assists that program. There are two parts to the program. AQRV monitoring consists of sampling lakes for a number of chemical and biological parameters. The second part is the National Atmospheric Deposition Program (NADP) and involves taking weekly samples from a wet and dry deposition collector located at South Pass on the Washakie Ranger District.

The AQRV program began approximately 10 years ago. The Shoshone and Bridger-Teton Forests conducted a screening sampling effort in 1984 and 1985 in which many lakes were sampled for monitoring potential. On the Shoshone National Forest, Lower Saddlebag Lake in the Popo Agie Wilderness and Ross Lake in the Fitzpatrick Wilderness were selected for monitoring. Lake selection included lake size, surrounding soil cover, elevation, and alkalinity hence the lakes sensitivity, as well as accessibility. These lakes are sampled regularly for trends and changes in lake chemistry and biology. Samples of macroinvertebrates and zooplankton are also taken as indicators of water quality. Certain species of these organisms are very sensitive to chemical changes in water so species composition provides valuable information.

The NADP program was also initiated approximately 10 years ago. This is a national program consisting of several hundred sites across the country which are sampled weekly at the same time and day. On the Bridger-Teton and the Shoshone National Forests this program is largely funded by cooperating industries and provides indicators of national air quality trends. The Shoshone National Forest has two NADP sites on the Washakie District. The one located at South Pass is administered by the Forest. The other located at Sinks Canyon is administered and funded by the Bureau of Land Management. PH and conductivity are two of many parameters measured.

#### Evaluation

In July 1993, the Rocky Mountain Region (Region 2) of the Forest Service completed an air resources management plan titled **Managing Air Resources in the Rocky Mountain Region.** This report outlines the process for assessing what each Forest in the region should be doing in terms of air resource management. It also prioritized airsheds in the region based on the extent to which each airshed is at risk from air pollution. Information about emissions and resource sensitivity was used to conduct the priority assessments. Measures of risk were applied to rank the threat to visibility, aquatic resources and terrestrial resources from each major emissions source in the airshed. The result was a priority for monitoring each resource value in the airshed. Resource values

were ranked from "A" (high level of concern) through "D" (low level of concern). An "A" is a top priority for monitoring because of high threat to a sensitive resource. A "B" is a slightly less perceived threat than in category "A" but monitoring whenever possible is recommended. "C" and "D" categories are not viewed as high priorities for monitoring for a number of reasons such as little or no threat, sufficient data are already available, low projected emissions, etc.

The Shoshone is part of the Greater Yellowstone Airshed along with the Bridger-Teton and a portion of the Targhee National Forests. However, because these other two Forests are in the Intermountain Region of the Forest Service (Region 4) the plan's strategies and summaries do not focus on them.

Findings in the report indicate that monitoring of aquatic resources is priority "A" and should be continued. More information is needed to be able to protect this resource. Visibility and terrestrial resources are also "A" priorities and there is limited information on them for the Greater Yellowstone Airshed. Since about 1989 there has been an IMPROVE site on the Bridger-Teton National Forest which monitors visibility. These resources are not being monitored at present on the Shoshone.

Results of the Wind River Lakes monitoring is documented in a report written by the Natural Resource Ecology Laboratory and Environmental Science and Technology Center at Colorado State University. The report, sent out in December 1994, documents and interprets 10 years of data. Some summary statements from the report are paraphrased as follows.

The Wind River Lakes represent the most sensitive lakes in the Western United States because their low base cation and acid neutralizing capacity (ANC) concentrations make them extremely sensitive to changes from environmental disturbance. Therefore, continuation of this long term monitoring program is necessary to detect future anthropogenic impacts. The baseline monitoring program has enabled us to detect trends and define the limits of natural variability in the chemical characteristics of the Wind River Lakes between 1984 and 1993. Preliminary findings suggest a trend for pH and ANC decreasing over time, with nitrates and sulfates (acid precursors) increasing over time. In other words, a change in water quality. Additional monitoring and analysis over a period of several years is needed.

The report makes several recommendations that are appropriate to point out: 1) continuation of the baseline sampling using the current laboratory (a change of labs occurred in 1990) until 1999, in order to be able to use the full period of record with appropriate statistical techniques for determining magnitude and direction of trends; 2) the monitoring program could be modified to sample the lakes at one location instead of three, preferably at the outlet since the lake locations are not significantly different; 3) if the number of lakes needs to be reduced because of budget constraints, Ross Lake in the Fitzpatrick Wilderness should be eliminated; 4) if more reductions are needed, the number of samples taken at each lake could be reduced to once per year. Based on this report and budgetary factors, less samples were taken at each lake in 1995.

The Clean Air Act contains provisions for Prevention of Significant Deterioration (PSD) of air quality in national wilderness areas. Before certain new air pollution sources are allowed to construct, they must apply for and receive a PSD permit from the appropriate air regulatory agency, in this case the State of Wyoming. The Forest Service carries out its responsibility under PSD by making recommendations to the State on permitting of new air pollution sources, whether or not permits are issued, and what modifications they may need. Collection of this monitoring data is resulting in a database upon which the Forest Service can base recommendations. The Bridger-Teton National Forest has recently developed a Model of Acidification of Groundwater In Catchments (MAGIC), a computer model using data from both Forests. MAGIC will be used to analyze potential new air pollution sources and will help provide recommendations to the State on permit applications.

| LIST OF PREPARERS | AREA OF EXPERTISE |
|---|---|
| Kim Barber | Wildlife Biology |
| Greg Bevenger[1] | Watershed |
| Sarah Creachbaum | Landscape Architecture |
| Garry Edson | Minerals |
| Dennis Eckardt[1] | Forestry |
| Jim Fischer | Engineering/Facilities |
| Dave Henry[1] | Wildlife Biology |
| Brent Larson | Recreation and Range |
| Scott Maki | Watershed and Air Resources |
| Chiara Palazollo | Landscape Architecture |
| Steve Posey | Fire Management |
| Bill Puckett | Archeology |
| Bob Rossman[1] | Recreation, Wilderness, & Air Resources |
| Skip Shoutis | Recreation and Wilderness |
| Bernie Spanogle | Range & Overall Review |
| Olga Gonzalez Troxel[1] | Monitoring Coordinator |
| Jennifer Watson | Lands |
| Ray Zubik | Fisheries Biology |

| LIST OF CONTRIBUTORS | AREA OF EXPERTISE |
|---|---|
| Kort Anderson | Roads |
| Mick Barrus | Recreation |
| Clint Dawson | Forestry |
| Kevin Elliott | Planning and Overall Review |
| Pat Heuer | Forestry |
| Joe Hicks | Range |
| Jeff Hogenson | Forestry |
| Kent Houston | Soils |
| Mary Jane Luther | Recreation and Wilderness |
| Judy Pasek[2] | Insects and Disease |
| Susan Patti | Budget and Finance |
| Catherine Pinegar | Forestry |
| John Pinegar | Recreation and Wilderness |
| Phyllis Roseberry | Overall Review |
| Bob Rush | Budget and Finance |

**1.** Members of Interdisciplinary Team
**2.** Judy Pasek is located at the Rocky Mountain Region Forest Health Management Department, Rapid City, South Dakota.

## INTERDISCIPLINARY TEAM CONCLUSIONS AND RECOMMENDATIONS

Overall, the intent or philosophy of the Forest Plan is still valid - to emphasize the non-commodity resources (recreation, visuals, wildlife, and water quality) while producing commodities at levels allowed by the Forest Plan. This takes into account the Forest Plan amendment which reduced the annual average Allowable Sale Quantity from 11.2 to 4.5 MMBF. Three recent Forest-wide analyses (the ASQ amendment, the Oil and Gas Leasing EIS, and the range analysis) provided the Team valuable information to supplement this report and the two resulting Forest Plan amendments have kept the Plan current. Additionally, eight amendments have been completed during the life of the plan. This report does note a continuing trend toward reduced budgets and personnel which has hampered monitoring efforts; however the Team has determined that the short fall between planned and actual budgets does not require a Forest Plan amendment at this time. While the interdisciplinary team does recommend some changes to be addressed in an amendment or during the presently scheduled Forest Plan revision (scheduled to begin in 1997), the team does not see the need for any significant course corrections in current Plan implementation.

Based on monitoring and evaluation, the interdisciplinary team recommends to the Forest Supervisor such changes in management direction, revisions, or amendments to the Forest Plan as are deemed necessary (36 CFR § 219.12 (k)). The interdisciplinary team, identified on the previous page (page 68), recommends the following changes. Other areas not mentioned here, such as timber and visuals, were considered adequate and the team feels no changes are necessary at this time. Some of these recommendations are subject to funding limitations.

### General

- The monitoring interdisciplinary team should develop a plan for monitoring the changing conditions of multiple resources over time - including but not limited to watershed, range, wildlife, fisheries, cultural resources, and vegetation - in an interdisciplinary fashion. Traditionally, field monitoring work has been conducted by each resource area so that at any given time there might be several individuals in the field gathering different data. One individual or crew would be focused on timber, for example, while another focused on wildlife. Emphasis on an ecosystem approach to management as well as declining budgets make integrated resource monitoring a high priority for providing adequate data to guide management direction. The intent of this recommendation is to expand on coordinated monitoring already occurring on the Forest.

### Recreation/Wilderness

1. During the past several years the Recreation Information Management System (RIM) used to monitor dispersed recreation use and experience and wilderness use has been in a state of flux pending approval of a new system at the national level. Given that RIM is, for the most part, no longer in use, it is recommended that the data sources and techniques used to monitor dispersed recreation use and experience and wilderness use be changed in table IV-1 of the Forest Plan. The Data Sources and Techniques sections should reflect the Meaningful Measures system which is in the early stages of implementation. See pages 10 and 15.

2. Forest Plan standards for campsite condition are stated in terms of Frissell Condition Class. Use of this system for monitoring proved to be unworkable when the Limits of Acceptable Change (LAC) process was undertaken in the Popo Agie Wilderness. The modified Cole method proved much more descriptive and helpful to problem solving than the Frissell method. The Data Sources and Techniques sections for dispersed campsite condition and wilderness campsite condition should be changed from Frissell Condition Class to the Cole method. See pages 10 and 16.

**Threatened, Endangered, and Sensitive Species**

- The Shoshone Forest Plan identified a limit for preventable grizzly bear mortalities of 6 bears for the Greater Yellowstone Area to be monitored on an annual basis. This standard was consistent with the U.S. Fish and Wildlife Service's Recovery Plan. Since that time the Interagency Grizzly Bear Committee has recommended and the U.S. Fish and Wildlife Service has adopted revised recovery monitoring criteria. It is recommended that the Allowable Variability section of Table IV-1 in the Forest Plan for Preventable Grizzly Mortalities be changed to read "not to exceed 4% of the population estimate calculated on a 6-year running average". This would then be consistent with the 1993 Grizzly Bear Recovery Plan. See page 22.

**Wildlife and Fish**

- Monitoring needs for addressing the issue of Management Indicator Species (MIS) should be re-examined in the upcoming Forest Plan revision. Monitoring is currently conducted for feature and recovery MIS and for ecological MIS when ground-disturbance projects are proposed. It is possible that MIS monitoring requirements will change at the national level when the forest planning regulations are revised. This monitoring item may need to be changed to be consistent with the revised regualtions. However, the team does not feel it is necessary to change this monitoring item at this time. See page 35.

**Water Resources**

- The Silvertip Watershed Monitoring Project was designed to assess the effects of a severe wildfire on watershed resources. Monitoring of the watersheds in this study occurred over a short period of time (1989-1993) following the Yellowstone Fires of 1988. Work completed thus far has shed light on watershed response to fire as well as to other land-disturbing activities. It is recommended that watershed recovery continue to be monitored over time (every 5th year). Continued monitoring of this project is subject to availability of funds. See page 44.

**Lands**

- Accelerated private land development adjacent to the Forest has resulted in an increased need for boundary location verification (land-line location). Locating boundaries before development occurs prevents costly adjustments later. Additional emphasis in this area will depend on availability of resources. See page 51.

**Facilities**

- Level 1 roads are closed roads. Level 1 maintenance work includes regular inspection of drainages and erosion control and correction of deficiencies. The 1994 Forest Plan amendment added a requirement that effectiveness of the closure also be inspected and deficiencies corrected. It is recommended that the Forest develop a minimum Level 1 road maintenance program. The program would identify the percentage of the road maintenance budget that would be allocated to level 1 maintenance, would facilitate tracking accomplishments and would prioritize roads needing level 1 maintenance. This would address a number of issues including travel management, watershed conditions, wildlife, and public concerns over road closure effectiveness. See page 61.

**Air Resource**

- In July 1993, the Rocky Mountain Region (Region 2) of the Forest Service completed an air resources management plan titled **Managing Air Resources in the Rocky Mountain Region**. The following recommendations made in that report pertain to both the Shoshone and Bridger-Teton National Forests and are endorsed by the interdisciplinary team (see page 67):

1. Baseline lake sampling in the Wind River Mountains should be continued using the current laboratory until 1999 in order to be able to use the full period of record with appropriate statistical techniques for determining magnitude and direction of trends.

2. The monitoring program could be modified to sample the lakes at one location instead of three, preferably at the outlet, since the lake locations are not significantly different.

3. If the number of lakes monitored needs to be reduced because of budget constraints, Ross Lake in the Fitzpatrick Wilderness should no longer be monitored.

4. If more reductions are needed, the number of samples taken at each lake could be reduced to once per year.